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A WORKING PROGRAM AGAINST INFLUENZA.

PREPARED BY AN EDITORIAL COMMITTEE OF THE
AMERICAN PUBLIC HEALTH ASSOCIATION

*And Based upon Papers, Committee Reports and Discussions Presented at the Meeting of the Association Held in Chicago, Illinois, December 9 to 12, 1918.**

FOREWORD.

SOMETHING is known concerning the nature of influenza. Much remains to be determined. Administrative health agencies, however, must act in the light of present knowledge. They cannot wait until the last word has been said in respect to the identity and nature of the microörganism or virus that causes the disease, or in respect to the channels through which it may be spread, or for the discovery of specific vaccines or sera for prevention or cure.

To afford such aid as may be possible to administrative health officials and to others concerned in the protection of the public health, a committee of the American Public Health Association was charged with the duty of preparing a provisional working formula, based upon the facts and opinions elicited at the meeting of the Association in Chicago, December 9 to 12, 1918.

This pamphlet is the result of deliberations of that committee. It is issued by the Association in the discharge of the duty to the public that the Association has assumed in the hope that it may prove helpful.

INTRODUCTORY STATEMENT.

The present epidemic is the result of a disease of extreme communicability. So far as information available to the committee shows, the disease is limited to human beings.

The microörganism or virus primarily responsible for this disease has not yet been identified. There is, however, no reason whatsoever for doubting that such an agency is responsible for it. Mental conditions may cause one to believe he has influenza when he has not, and may make the patient who has the disease suffer more severely than he otherwise would. No mental state alone, however, will cause the disease in one who is not infected by the organism or virus that underlies the malady.

While the prevailing disease is generally known as influenza, and while it will be so referred to in this statement, it has not yet been satisfactorily established that it is the identical disease heretofore known by that name, nor has it been definitely established that all preceding outbreaks of disease styled at the time "influenza" have been outbreaks of one and the same malady.

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There is no known laboratory method by which an attack of influenza can be differentiated from an ordinary cold or bronchitis or other inflammation of the mucous membranes of the nose, pharynx, or throat.

There is no known laboratory method by which it can be determined when a person who has suffered from influenza ceases to be capable of transmitting the disease to others.

Laboratories are necessary agencies for the supervision and ultimate control of the disease. The research laboratory is necessary for the discovery of the causative microörganism or virus, and for the discovery of some practicable method for the propagation of a specific vaccine and a curative serum. Clinical laboratories are necessary for the supervision and control of such vaccines and sera as may be used from time to time for the prevention of the disease and for therapeutic purposes, and for the information such laboratories can give to health officers and physicians as to such variations in the types of infective microörganisms, as occur during the progress of an epidemic.

Deaths resulting from influenza are commonly due to pneumonias resulting from an invasion of the lungs by one or more forms of streptococci, or by one or more forms of pneumococci, or by the so-called influenza bacillus, or bacillus of Pfeiffer. This invasion is apparently secondary to the initial attack.

Evidence seems conclusive that the infective microörganism or virus of influenza is given off from the nose and mouth of infected persons. It seems equally conclusive that it is taken in through the mouth or nose of the person who contracts the disease, and in no other way, except as a bare possibility through the eyes, by way of the conjunctivæ or tear ducts.

Prevention.

If it be admitted that influenza is spread solely through discharges from the noses and throats of infected persons finding their way into the noses and throats of other persons susceptible to the disease, then no matter what the causative organism or virus may ultimately be determined to be, preventive action logically follows the principles named below and, therefore, it is not necessary to wait for the discovery of the specific microörganism or virus before taking such action.

I. Break the channels of communication by which the infective agent passes from one person to another.

II. Render persons exposed to infection immune, or at least more resistant, by the use of vaccines.

III. Increase the natural resistance of persons exposed to the disease, by augmented healthfulness.

I. Breaking the channels of communication.

(a) By preventing droplet infection. The evidence offered indicates that this is of prime importance.

(b) By sputum control. The evidence offered indicates that the danger here is due chiefly to contamination of the hands and common eating and drinking utensils.

(c) By supervision of food and drink. Evidence offered does not indicate much danger of infection through these channels.

Details and practical methods possible for the limitation of infection through droplets, sputum, and food and drink are discussed later under special preventive methods.

II. Immunization and vaccines.

(See the report of the laboratory committee appended.)

In the present epidemic vaccines have been used to accomplish:

1. The prevention or mitigation of influenza *per se*.

2. The prevention or mitigation of complications recognized as due to the influenza bacillus or to various strains of streptococci and pneumococci.

In relation to the use of vaccines for the prevention of influenza, the evidence which has come to the attention of the committee as to the success or lack of success of the practice is contradictory and irreconcilable. In view of the fact that the causative organism is unknown, there is no scientific basis for the use of any particular vaccine against the primary disease. If used, any vaccine must be employed on the chance that it bears a relation to the unknown organism causing the disease.

The use of vaccines for the complicating infections rests on more logical grounds, and yet the committee has not sufficient evidence to indicate that they can be used with any confident assurance of success. In the use of these vaccines the patient should realize that the practice is still in a developmental stage.

The committee believes that when vaccines are used experimentally for the purpose of determining their preventive or curative value, the following conditions should be complied with:

1. The groups of vaccinated and unvaccinated persons should be the same in number.

2. The relative susceptibilities of the two groups should be equal, as measured by age and sex distribution, previous exposures to infection without development of influenza and a previous history as to recent attacks of the disease.

3. The degree of exposure in each group should be practically the same in duration and intensity.

4. The groups should be exposed concurrently during the same stage of the epidemic curve.

III. Increased natural resistance of persons exposed to infection.

Physical and nervous exhaustion should be avoided by paying due regard to rest, exercise, physical and mental labor and hours of sleep. The evidence is conclusive, however, that youth and bodily vigor do not guarantee immunity to the disease.

The nature of the preventive measures practicable and necessary in any given community depends in a large part upon the nature of the community itself, as to population characteristics, industries, and so on, and upon the stage and type of the epidemic curve. For example, the measures to be adopted in a purely rural community would not be practicable or desirable in a large metropolitan area, nor would the measures desirable and feasible at the beginning or end of an epidemic be found those best adapted for the intervening period. The committee has found it impossible, therefore, to lay down any rules for the guidance of all health officials alike in preventive measures. The most it has been able to do has been to state certain general principles that in its judgment should underlie administrative measures for the prevention of influenza. The application of these principles to the needs of any particular community must be left for determination by the officers of that community who are responsible for the protection of its public health.

The preventive measures recommended by the committee are as follows:

A. Efficient organization to meet the emergency, providing for a centralized coördination and control of all resources.

B. Machinery for ascertaining all facts regarding the epidemic:

1. Compulsory reporting.
2. A lay or professional canvass for cases, etc.

C. Widespread publicity and education with respect to respiratory hygiene, covering such facts as the dangers from coughing, sneezing, spitting, and the careless disposal of nasal discharges; the advisability of keeping the fingers and foreign bodies out of the mouth and nose; the necessity of handwashing before eating; the dangers from exchanging handkerchiefs; and the advantages of fresh air and general hygiene. Warnings should be given regarding the danger of the common cold, and possibly colds should be made reportable so as to permit the sending of follow-up literature to persons suffering from them. The public should be made acquainted with the danger of possible carriers among both the sick and the well and the resultant necessity for the exercise of unusual care on the part of everybody with respect to the dangers of mouth and nasal discharges.

D. Administrative procedures:

1. There should be laws against the use of common cups, and improperly washed glasses at soda fountains and other public drinking places, which laws should be enforced.

2. There should be proper ventilation laws, which laws should be enforced.

Since the disease is probably largely a group or crowd problem, the three following sub-heads are especially important.

3. *Closing.*—Since the spread of influenza is recognized as due to the transmission of mouth and nasal discharges from persons infected with influenza, some of whom may be aware of their condition but others unaware of it, to the mouths and noses of other persons, gatherings of all kinds must be looked upon as potential agencies for the transmission of the disease. The limitation of gatherings with respect to size and frequency, and the regulation of the conditions under which they may be held must be regarded, therefore, as an essential administrative procedure.

Non-essential gatherings should be prohibited. Necessary gatherings should be held under such conditions as will insure the greatest possible amount of floor space to each individual present, and a maximum of fresh air, and precautions should be taken to prevent unguarded sneezing, coughing, cheering, etc.

Where the necessary activities of the population, such as the performance of daily work and earning of a living, compel considerable crowding and contact, but little is gained by closing certain types of meeting places. If, on the other hand, the community can function without much of contact between individual members thereof, relatively much is gained by closing or preventing assemblages.

Schools: As to the closing of schools there are many questions to be considered.

(a) Theoretically, schools increase the number and degree of contacts between children. If the schools are closed, many of the contacts which the children will make are likely to be out of doors. Whether or not closing will decrease or increase contacts must be determined locally. Obviously, rural and urban conditions differ radically in this regard.

(b) Are the children in coming to and going from school exposed to inclement weather or long rides in overcrowded cars?

(c) Is there an adequate nursing and inspection system in the schools?

(d) Is it likely that teachers, physicians and nurses can really identify and

segregate the infected school child before it has an opportunity to make a number of contacts in halls, yards, rooms, etc.? We suggest that children suspected of having influenza and held in school buildings for inspection should be provided with and required to wear face masks.

(e) Will the closing of schools release personnel or facilities to aid in fighting the epidemic?

(f) If schools are kept open, will the absence of many teachers lower the educational standards?

(g) If a number of pupils stay at home because of illness or fear, will they not constitute a heavy drag upon their classes when they return?

(h) If schools are closed, is there likely to be an outbreak in any case when they are reopened?

Churches: If churches are to remain open, services should be reduced to the lowest number consistent with the adequate discharge of necessary religious offices, and such services as are held should be conducted in such a way as to reduce to a minimum, intimacy and frequency of personal contact.

Theatres: As regards theatres, movies, and meetings for amusement in general, it seems unwise to rely solely or in great part upon the ejection of careless coughers. In the first place it is difficult to determine who is a careless cougher, and after each cough, danger has already resulted. It seems, too, that the closing of theatres may have as much educational value as their use for direct educational purposes, etc. Discrimination as to closing among theatres, movies etc., on the basis of efficiency of ventilation and general sanitation, may be feasible.

Saloons, etc.: The closing of saloons and other drinking places should be decided upon the basis of the probability of spread of the disease through drinking utensils and the conditions of crowding.

Dance halls, etc.: The closing of dance halls, bowling rooms, billiard parlors and slot-machine parlors, etc., should be made effective in all cases where their operation causes considerable personal contact and crowding.

Street cars, etc.: Ventilation and cleanliness should be insisted upon in all transportation facilities. Overcrowding should be discouraged. A staggering of opening and closing hours in stores and factories to prevent overcrowding of transportation facilities may be cautiously experimented with. In small communities where it is feasible for persons to walk to their work it is better to discontinue the service of local transportation facilities.

Funerals: Public funerals and accessory funeral functions should be prohibited, being unnecessary assemblies in limited quarters, increasing contacts and possible sources of infection.

4. *Masks.*—The wearing of proper masks in a proper manner should be made compulsory in hospitals and for all who are directly exposed to infection. It should be made compulsory for barbers, dentists, etc. The evidence before the committee as to beneficial results consequent upon the enforced wearing of masks by the entire population at all times was contradictory, and it has not encouraged the committee to suggest the general adoption of the practice. Persons who desire to wear masks, however, in their own interests, should be instructed as to how to make and wear proper masks, and encouraged to do so.

5. *Isolation.*—The isolation of patients suffering from influenza should be practiced. In cases of unreasonable carelessness, it should be legally enforced most rigidly.

6. *Placarding.*—In cases of unreasonable carelessness and disregard of the public interests placarding should be enforced.

7. *Hospitalization.*—The theory of complete hospitalization is that, if all the sick were hospitalized the disease would be controlled. In certain somewhat small communities where hospitalization of all cases was promptly inaugurated the disease did come quickly under control. It must be recognized, however, that unless every infective person can be detected and identified as such and removed to the hospital before he has infected others, hospitalization cannot be depended upon to eliminate the disease.

In general, home treatment is to be advocated where medical, nursing and other necessary facilities are adequate, and where home treatment is not directly contra-indicated by the danger of infecting others. The hospitalization in any case, mild or severe, should be undertaken only when facilities for home treatment are inadequate with respect to medical and nursing care or otherwise. The objection to routine hospitalization of mild cases lies in the fact that patients not already suffering from secondary infections may acquire them by exposure to hospital cases already so infected. The objection to the routine hospitalization of severe cases lies in the danger to the patient necessarily incident in the transfer from home to the hospital.

8. *Coughing and Sneezing.*—Laws regulating coughing and sneezing seem to be desirable for educational and practical results.

9. *Terminal Disinfection.*—Terminal disinfection for influenza has no advantage over cleaning, sunning and airing.

10. *Alcohol.*—The use of alcohol serves no preventive purpose.

11. *Sprays and Gargles.*—Sprays and gargles do not protect the nose and throat from infection, for the following reasons:

(a) So far as the knowledge of the committee extends, no germicide strong enough to destroy infective organisms can be applied to the nose and throat without at the same time injuring the mucous membranes.

(b) Irrigation of the nose and throat to accomplish the complete mechanical removal of the infective organism is impracticable.

(c) Their use tends to remove the protective mucus, to spread the infection and to increase the liability of actual entrance of the infective organisms.

(d) Their domestic use is liable to lead in families to a common employment of the same utensils.

(e) The futility of sprays and gargles has been demonstrated with respect to certain known organisms such as the diphtheria bacillus and the meningococcus.

Miscellaneous Considerations.

1. Colleges, asylums and similar establishments may with advantage enforce rigid institutional quarantine against the outside world, if they begin in the early stage of an epidemic, provided they are so located and conducted as to render the procedure reasonably likely to be effective, even temporarily; for even temporary success will postpone the appearance of the disease, if it appears at all, to a time when the patients will be more likely to be able to have adequate medical and nursing care.

2. The recommended measures for control, even if they do not accomplish the desired end, should at least be instrumental in distributing the epidemic over a

longer period of time, which in itself is highly desirable.

3. The statistics of the disease and the keeping of proper records are extremely important. The lack of knowledge regarding innumerable factors in reference to the disease makes all the more desirable complete case records, etc.

4. The committee wishes to emphasize the need for the complete statistical study of the collected data on the mortality, morbidity, case fatality, duration, economic aspects, and therapeutics of the disease. Through the collection of the facts in a uniform manner, and through the analysis of such tabulated data, especially mathematical graduation, and testing and study of the figures, important contributions to the natural history and typical characters of the disease may be expected. General principles as to the etiology, fatality and practical management of influenza may follow from the extensive survey of the epidemic in the statistical laboratory as well as from the intensive bedside observation of single cases of the disease.

5. The measures recommended are calculated to be effective in the promotion of respiratory hygiene in general and particularly in the control of pneumonia and other respiratory infections.

ADMINISTRATIVE MEASURES FOR RELIEF.

The committee on administrative measures for relief would submit the following considerations as constituting a summary of the important measures for meeting epidemic conditions:

I. General Rules.

1. Compulsory reporting.

2. Isolation, by coöperation and education, to a point where it does not diminish the willingness of the physician to report.

3. Placarding would seem to be subject to the same limitations as is isolation.

4. The closing of schools, prohibition of funerals, etc., being preventive measures, are not touched upon in this report, except to mention that the closing of many agencies will release medical, nursing, and volunteer services for special influenza work.

5. It may be necessary to grant authority and power to the health authorities to administer relief.

II. Preliminary Measures.

1. The listing and distribution of resources, including physicians, nurses, social workers, nurses' aids, clerks, domestics, laundresses, automobiles, chauffeurs, mask makers and volunteers of all kinds.

All available publicity channels should be used to promote volunteer service.

An appeal should be made for voluntary donors of human blood serum from convalescent influenza patients, to be held in readiness for use in treatment.

2. The centralization of resources, under one control, with central and branch headquarters, the city being districted for medical, nursing and other work.

The central headquarters should be ordinarily under the supervision of a board representative of the most important agencies concerned, the board's work to be administered through a manager (presumably the health officer) selected for his fitness.

3. The service should be maintained on a 24-hour basis, and a system of outgoing and incoming telephone service is essential.

4. The local authorities should get and keep in touch with state and national agencies.

III. Current and Continuous Analysis of Case Situation

1. In the smaller communities a canvass should be made of all physicians, soliciting information as follows:

(a) Number of cases under care.

(b) Number of cases needing hospital treatment.

(c) Number of cases needing home nursing care.

(d) Number of cases requesting medical service but not reached.

This information will indicate the situation as regarding the need for emergency nursing and medical service, and should be acquired as fully as possible in larger communities, through various agencies such as a current lay or police canvass of homes, etc. The continuous classification of cases according to these groupings is of practical value.

IV. Analysis, Augmentation and Organization of Principal Facilities.

(A) *Field Nursing.*

1. Ordinarily nursing facilities utilized in general public health work should be diverted to meet the epidemic situation, and should be used on a district basis, with all other available facilities, under one supervision.

2. Nursing assistants, volunteers, etc., should be used wherever possible in homes and institutions, under expert supervision, after classification and assignment on a basis of minimum standards as to fitness, and such intensive training in the care of influenza and pneumonia patients as may be feasible.

3. From the standpoint of the patient, home treatment is to be advocated, if medical, nursing, disease preventive and other facilities are adequate.

4. Restriction so far as possible through the pressure of public opinion should be brought against the unnecessary use of private nurses.

5. Automobile transportation should be provided, and the nursing service used to encourage isolation and education.

6. Special record forms are essential for this and the medical work, and a special sub-committee is prepared to meet this problem.

7. Provision as to housing and care should be made for out of town nurses.

8. We recommend further training with reference to influenza for all graduates of Red Cross home nursing courses and more extensive use of their services. This would necessitate frequent and careful registration (names, addresses and telephone numbers) and further information regarding personal health, age and ability and willingness to serve.

(B) *Emergency Medical Service.*

1. The medical service should be handled through the central office, the physicians being responsible to the central office, though perhaps assigned to district offices.

2. In this emergency service there should be utilized all available physicians such as school and factory physicians, volunteers, practitioners on a paid basis, fourth year medical students, etc. This service should cover all calls reported as unreached by private physicians or received through other channels, and should be coördinated with the special nursing service, being provided with automobile transportation, machines being hired if necessary.

3. The emergency medical service should be used to select cases needing hospital care.

4. It may be feasible to institute a central clearing house in certain districts for private physicians' calls.

5. An arrangement should be made through the medical licensing board for the granting of temporary permits to practice to reputable physicians from out of the state, at the request of the Central Influenza Committee.

6. In some localities it may be feasible to district the local practitioner and to have him meet special calls on a part time basis for adequate compensation.

7. Certain of the relatively non-essential specialties should be discouraged, and the physicians in those specialties urged to volunteer for emergency district work. This type of service may be operated on a pay or free basis.

8. Presumably some effort should be made, through an authoritative medical commission, to suggest standard methods of treatment, and wise limitations as to therapeutic procedure.

(C) *Hospital Facilities.*

1. It is essential that the facilities, if possible, be kept ahead of the demand. A daily canvass should be made and data collected regarding available beds, medical and nursing needs, domestics, food, cots, supplies, etc. A regular visit by an inspector will probably prove more effective than an attempt at telephone communication.

2. Under most conditions a central clearing house, covering most if not all of the hospitals, is advisable for the admission of cases. Through this channel the severer cases may receive first consideration. Owing to constant changes in the hospital bed situation, the daily canvass of facilities may not be wholly depended upon; on the contrary, it may usually be necessary to telephone the hospital in order to make sure regarding the admission of a particular case. In any event the hospitals, if facilities are inadequate, should be impressed with the necessity for admitting only the most severe or needy cases, pay or free. Special hospital arrangements should be provided for pregnant women.

3. It is advisable to add wards or tents or new equipment to existing institutions rather than to establish entirely new emergency hospitals. If practicable, certain hospitals may be urged to handle influenza cases exclusively.

4. Non-emergency surgical and chronic medical cases amenable to home treatment should be dehospitalized.

5. A convalescent home, if adjacent to the hospital, may serve for the care of mild and convalescent cases, thereby increasing the space in the hospital for acute cases, obviously involving an increase in the nursing facilities.

6. A canvass of ambulance facilities should be made, ambulances being requisitioned with payment, or hired by contract, if necessary. Automobiles and motor trucks should be potentially mobilized for this purpose. Frequently military equipment may be used if accessible.

V. Social and Relief Measures.

1. The central office should keep the family advised regarding the patient, thereby saving telephone calls, trolley fares and worry on the part of the family, and thereby increasing the willingness for hospitalization.

2. Volunteer workers such as Red Cross volunteers, teachers, relatives, etc., should be placed in care of families where the responsible members are dead or hospitalized, this service being under expert social supervision, and the families in touch with the supply system. Supervision of placed-out children is also necessary.

3. Homes should be investigated before patients are discharged into them, when destitution or other untoward circumstances are apparent.

4. Precaution should be taken that institutions and families too busy with the influenza situation to look after their own needs, are covered by the general relief measures.

5. Ordinary charitable relief should be handled through the routine agencies, the service coördinated with the other epidemiological measures. Churches, lodges, etc., should be urged to handle their own cases, in order to relieve the pressure on the central agency. Aid should be immediate, without protracted investigation.

6. Recreation facilities (motoring, etc.) should be provided for the physicians and nurses while off duty.

VI. Food.

1. Available central cooking facilities should be used so far as is necessary, such as the dietetic equipment in high schools, normal schools, colleges, etc., with a delivery system to families and institutions in need.

2. Individual families should be encouraged to cook additional amounts, the same to be delivered to central diet kitchens for distribution, a standard list of prepared foods needed being devised and advertised, with recognition of racial customs and preferences.

3. It may be necessary to establish canteens in sections of the city.

VII. Laundry.

1. A special collection and distribution system may be essential both for homes and institutions.

2. It may be necessary to take over a public laundry with compensation, or a private non-medical institution laundry.

VIII. Provision for Fatalities.

1. Death reporting should be prompt (24 hours) and a record kept so as to insure prompt disposal of bodies.

2. A daily canvass of available coffins should be made, labor assured for construction, and possibly no coffins sold without the permit of the Influenza Administration Office.

3. If morgue facilities are inadequate a central place should be provided, with embalming facilities, for the temporary disposal of bodies.

4. A canvass of hearses should be made and regulations issued prohibiting unnecessarily long hauls, insisting on maximum capacity loads, etc. A central control will prevent unnecessary duplication as to routes, etc.

5. A reserve supply of trucks and automobiles should be at hand for use in various ways in connection with the handling of fatal cases.

6. The number of graves required should be estimated and labor released from public works or secured through other channels (possibly military) for digging. Possibly temporary trench interment may be necessary.

IX. Education, Instruction and Publicity.

Literature and special instructions will be necessary on many phases, including the following:

1. Instructions to physicians as to reporting, facilities available, district arrangements, etc.

2. Advice to physicians regarding treatment standards and suggestions.

3. Instructions for families, to be distributed by nurses, physicians, social workers, druggists, etc., covering the problems of care during the physician's absence.

4. Instructions to the public as to where aid may be secured, to be printed in various languages, and distributed by druggists, displayed in street cars, used in the press, etc.

5. Instructions for families on "What to do till the doctor comes."

6. Instructions to physicians, factory managers, school superintendents, etc., urging the necessity for immediate home and bed treatment at the first sign of respiratory disease.

7. Popular literature on the essentials of adequate care, the danger of returning to work too soon, etc. Popular press space is worth paying for, if it cannot be secured otherwise.

8. Popular publicity as to legitimate medical, nursing, undertaker, drug, and other charges, to prevent profiteering.

X. Miscellaneous.

1. The coöperation of pharmaceutical agencies should be secured to insure an adequate supply of drugs and druggists.

2. Influenza victims and their families should have "first call" on fuel deliveries.

3. While follow-up procedures are not legitimately a factor in the epidemic situation, their consideration is essential to an adequate meeting of the entire problem. This means adequate provision for medical examination and nursing care, relief measures, industrial employment problems, the follow up of special sequelæ such as cardiac affections, tuberculosis, etc.

4. It is finally suggested that Health Department draw up a program based on the above outline, holding it in reserve for future use, if not immediately needed, and modifying the proposal to fit the size and other characteristics of the particular community.

THE BACTERIOLOGY OF THE 1918 EPIDEMIC OF SO-CALLED INFLUENZA.

The epidemic disease known as influenza is believed to be due to an undetermined organism which causes an infection that lowers the resistance of the body as a whole, and of the respiratory organs in particular. This allows the invasion of other pathogenic microörganisms. The most important complicating infections are due to the influenza bacilli, different strains of pneumococci and different varieties of streptococci. Some careful observers regard certain of these organisms as the primary cause.

In each case, one or several of these microörganisms may be present. In different portions of the country the dominating variety of organism has been found to differ.

VACCINES.

Assuming that the cause of the epidemic is an unknown virus, it does not seem possible at present to prevent the primary disease by vaccination with known organisms. Against the secondary infections, there would seem to be a theoretical basis for the use of vaccines, and especially for the use of vaccines prepared from organisms responsible for complications which may differ in various localities at various times. This variable bacterial flora may militate against the practical application of vaccination on a large scale, because it would seem to require frequently repeated vaccinations with the flora that may be met with. It is impossible at present to evaluate the reports from the use of these vaccines adjusted to meet local conditions. More data obtained under carefully controlled conditions are needed.

Stock vaccines made from the influenza bacillus alone or from other bacteria, have been used to considerable extent. The injections of stock vaccines have seemed to mitigate to some degree some outbreaks

of influenza and also the severity of the complicating infections; but in those instances in which the results of the use of vaccine have been controlled, no appreciable results have been obtained. The fact that the vaccine is usually employed after the epidemic has broken out and is perhaps on a decline, and the fact that an unknown number of people have been exposed, make it very difficult to draw conclusions as to its efficacy.

Recommendations.

Your committee recommends that until such time as the efficacy, or the lack of efficacy, of prophylactic vaccination against influenza is established, vaccine if used, should be employed in a controlled manner, under conditions that will allow a fair comparison of the number of cases and of deaths among the vaccinated and non-vaccinated groups. Particular attention should be directed to securing data as to the period in the epidemic at which vaccinated and non-vaccinated persons developed the disease.

Your committee is of the opinion that the indiscriminate use of stock vaccines against influenza and influenza and pneumonia cannot be recommended.

Nothing in these recommendations should be interpreted as discouraging the use of a pneumococcus stock vaccine against lobar pneumonia.

This epidemic emphasizes the importance of properly equipped laboratories.

History and Statistics of the Epidemic.

Your sub-committee wishes to say that in view of the fact that the historical and other data of the epidemic are still in process of collection, no positive statement can be made at the present time on the precise incidence of the disease in the American population. On the basis of the best data available your sub-committee estimates that there were not less than 400,000 deaths from the disease in the United States during the months of September, October and November, 1918. The major portion of this mortality occurred at ages 20–40, when human life is of the highest economic importance. We would suggest that this sub-committee be authorized to coöperate with the special committee on statistical study of the epidemic of the Section on Vital Statistics of this Association, and that the data collected through that latter special committee be reported through the sub-committee on history and statistics of the epidemic to the general reference committee on the influenza epidemic. Standard forms for purposes of statistical tabulation, analysis and graphic presentation will be submitted in a supplementary report at an early date.

Suggestions.

In view of the probability of recurrences of the disease from time to time during the coming year, health departments are advised to be ready in advance with plans for prevention, which plans shall embody the framework of necessary measures and as much detail as is possible. Laws plainly necessary should be enacted and rules passed now. Emergency funds should be held in reserve or placed in special appropriations, which appropriations can be quickly made available for influenza prevention work.

The probability that as an after effect of the influenza epidemic there will be an unusually high pneumonia rate for several years should be taken into consideration.

Of measures for the control of the disease, bacteriologic studies as to the nature of the organisms causing the primary infection and as to bacteria associations, new and improved procedures leading to the production and use of effective vaccines and curative sera, and the fresh air treatment of the infected, appear to offer most promise.

APPOINTMENT AND ORGANIZATION OF THE COMMITTEES.

The executive committee of the American Public Health Association appointed the following reference sub-committees on influenza:

Sub-Committee on Bacteriology of the 1918 Epidemic of Influenza.

Dr. W. H. Park of New York City, *Chairman.*
Dr. G. W. McCoy, Washington, D. C.
Dr. Henry Albert, Iowa City, Iowa.
Dr. D. J. Davis, Chicago, Illinois.

Sub-Committee on History and Statistics of the Epidemic.

Dr. William H. Davis, Washington, D. C., *Chairman.*
Frederick L. Hoffman, Newark, N. J.
Dr. John T. Black, Hartford, Conn.
E. W. Kopf, New York City.

Sub-Committee on Administration of Measures for Relief.

Dr. D. B. Armstrong, Framingham, Mass., *Chairman.*
Dr. W. C. Woodward, Boston, Mass.
Miss Eunice H. Dyke, Toronto, Canada.
Miss Edna L. Foley, Chicago, Ill.

Sub-Committee on Measures for Prevention.

Dr. Rupert Blue, Washington, D. C., *Chairman.*
Dr. W. A. Evans, Chicago.
Dr. J. A. Haynes, Columbia, S. C.
Dr. M. S. Fraser, Winnipeg, Man.

The four sub-committees formed a general committee of which Dr. Rupert Blue was chairman and Dr. W. A. Evans, vice-chairman. The various sub-committees attended the discussions on influenza and read the papers and discussions. The general committee held one meeting at which the sub-committees presented their reports. The report of the sub-committee on relief was discussed by the general committee, but not voted on or adopted. It is printed substantially as presented by the sub-committee to the general committee.

The report of the sub-committee on bacteriology was presented to the general committee and by them discussed, but not voted on or adopted by the general committee. It is printed as presented by the sub-committee.

The report of the sub-committee on history and statistics was presented to the general committee and by them discussed but was not voted on or adopted by the general committee. It is printed as it was presented by the sub-committee.

The sub-committee on measures for prevention suggested a first draft or rough sketch.

On the last day of the meeting, the executive committee of the Association appointed an editing committee composed of Dr. W. A. Evans, chairman; Dr. D. B. Armstrong, Dr. W. H. Park and Dr. William H. Davis, each representing a sub-committee, and Dr. W. C. Woodward and Mr. E. W. Kopf, as editorial advisors, to edit the report of the reference committee and to carry it through the press and to distribute it to those in attendance on the meeting.

The committee read the reports of the committees on statistics, laboratory problems, and measures for relief, but did not alter them. They wrote the report on prevention.

Very respectfully submitted,

W. A. EVANS, *Chairman.*
D. B. ARMSTRONG.
WILLIAM H. DAVIS.
E. W. KOPF.
WILLIAM C. WOODWARD.

NOTE: Dr. W. H. Park, having returned to New York, did not serve on the editorial committee.

[Chicago,] December 13, 1918.

TEAMPLAY IN PUBLIC HEALTH.

GEORGE E. VINCENT,
President of the Rockefeller Foundation.

Abstract of Address before the American Public Health Association, Chicago, December 12, 1918.

THERE are at least three stages in the development of a successful social movement: a period of agitation, a period of organization and a final incorporation in the accepted order of things. The chief voluntary public health societies have rendered good service in the pioneer stage of agitation. They have directed attention to health problems; they have informed the public; they have fostered opinion to support municipal and state officers; they have demonstrated the effectiveness of certain policies; they have helped to create the beginnings of a public health literature. Let all this be granted ungrudgingly, even with warm appreciation, but at the same time let us ask whether the pioneer period has not passed, and whether the stage of organization is not seriously overdue.

Three years have passed since Dr. Frederick R. Green, in a trenchant paper, asserted that the voluntary public health agencies of the country stood in need of closer comradeship. He showed that a bewildering number of societies were working in almost complete disregard each of the other in the field of preventive medicine, with consequent confusion, overlapping, duplication, rivalry, and waste of energy and money. Largely as a result of this vigorous and somewhat disconcerting arraignment, a committee was appointed to consider the coördination of these associations. Two meetings of the representatives of the chief agencies were held. Little or nothing, however, was accomplished.

The war which taught us to subordinate individual and group interests to the common welfare, seemed likely soon to have its influence upon the agencies of public health. Our doctors were mobilized and began under military auspices the practice of social medicine. It was hoped that federal control might be extended to public health. Certain eager enthusiasts suggested the appointment of a national health administrator who should ordain a hygienic millennium. November 11 marked the high-tide of centralized control which is steadily receding. How far back it will sweep we have yet to learn. A little permanent gain has been recorded. The President on the first of last July issued an order which placed upon the United States Public Health Service the responsibility for bringing together the twelve government bureaus, officers or war council committees which deal with different phases of public health. Since then the Service has issued a comprehensive, national health program.

Under the new conditions American voluntary public health agencies cannot wholly withstand the demand for teamplay. A mere statement of the situation puts the societies on the defensive. Twenty-eight associations exist for the sole purpose of promoting some phase of public health. Twenty-nine others, whose primary function falls in a different field, devote a part of their energies and funds to work in preventive medicine. The total, fifty-seven, is an appropriate symbol of variety. Unlike the famous fifty-seven, however, these are not products of a unified establishment and bear no standardized label. While some of these groups have slight coöperative arrangements, and although their leaders occasionally meet in conference at

conventions, it is substantially true to say that these associations go their own ways, pursue their own methods, collect their own funds, and appraise their own accomplishments.

It has been impossible to secure complete information from all of these societies. Only thirty-four out of fifty-seven societies reported. The delinquents belong, with few exceptions, among the less important agencies. For the year 1917 the total expenditures reported were $1,572,696.23. Of the above total nineteen societies in the first group spent $573,470.34, a part of which was unquestionably extraordinary expenditure for war purposes. The percentage of salary payments to total expenses varied from nearly 65 to 12½. The average for fifteen societies was 33.9. Facts about membership are also incomplete. In the group of special public health societies, the National Tuberculosis Association with 4,000 members and the National Organization for Public Health Nursing with 2,500 are the most important. The others vary from 1,000 to 200 members. The figures for the second group mean very little. For example, to include the 30,000,000 members of the American Red Cross or the 2,000,000 members of the General Federation of Women's Clubs would be distinctly misleading.

The headquarters of the different societies are concentrated in a few cities. Thirty-two have their chief offices in New York. Most of the others are in Boston, Philadelphia, Chicago, and Washington.

If the voluntary agencies are grouped on the basis of the interests which they touch, the following significant results are obtained: Thirty-five deal with some phase of child welfare. Eleven are concerned with tuberculosis. Ten have a bearing upon social diseases. Eleven are interested in industrial accidents. Nine undertake to deal with crime. Seven are wholly or in part working in the field of mental hygiene. Five have to do with problems of blindness. Three promote the cause of public health nursing. Another three study questions of eugenics. Three more promote the cause of first aid to the injured. Two deal with mouth hygiene, and two with posture. In each of the fields of cancer, epilepsy and heart disease there is only one special society.*

No one would undertake seriously to defend the present state of affairs on the score of efficiency, economy, or public welfare. So far the critics of this chaos have laid chief stress upon the waste of time, energy and money, the confusion of the public mind, the overlapping of effort, and the discrediting of public health undertakings. Serious as these things are, there are other dangers less conspicuous but even more subtly menacing. Thus underlying the whole movement is the assumption that there is a definite and verified body of scientific and administrative knowledge which is guiding the activities of all public health agencies, governmental and voluntary. It is precisely such a body of knowledge that is needed. Does not the existence of so many societies, each with its specialty, actually hinder the accumulation of the tested scientific knowledge which is essential to successful public health development? Each group tends to over-emphasize the significance of the disease with which it deals. The temptation to demonstrate striking achievements as a basis for soliciting support funds cannot be wholly resisted. This does not mean that officers of these societies are conscious of deceit or misrepresentation. The capacity of self-deception, especially in altruistic

*These statements of fact together with many points throughout this paper are derived from a special "Report on Voluntary Agencies in the Field of Public Health" made recently by Dr. Ernst C. Meyer of the Department of Surveys and Exhibits of the International Health Board.

endeavor, is well-known. The partisan in public health, as in every other human activity, needs the constant check of impartial criticism and of objective tests.

Another danger lies in prematurely forcing upon municipal and state administrations half-baked public health policies which may endanger the common welfare, waste the public funds, discredit the cause of public health in a community, and produce popular reaction. Again, under existing conditions, it is practically impossible either in a given community or in the nation, to develop a unified public health program such as that which has been recently offered by the United States Public Health Service. Unless the plan of the government to bring its various bureaus into a coördinated movement can receive the unified support of private public health agencies, the results will fall far short of even a modest ideal.

The development of an effective public health program is dependent upon three things: (1) A definite body of scientific knowledge, medical, statistical, and sociological; (2) the effective demonstration of the application of such knowledge in communities, states and the nation; (3) a systematic, unified, consistent education of the public in the scientific basis and the principles of procedures of public health.

Does not the existing chaos of voluntary effort in the United States actually hinder rather than further these three essential things? There is too little unbiased research. The private agencies are so absorbed in collecting funds, informing the public of their achievements and issuing ex-parte literature that time, energy, and money are lacking for strictly scientific investigation. Moreover, unified administrative procedures are rendered difficult if not impossible because each group seeks to magnify its own function at the expense of those of other agencies. Again, so far as popular education goes, the different societies are distributing to an uncritical public a variety of suggestions and assertions, many of them inconsistent, some of them actually contradictory. It is full time to face this indefensible situation with complete frankness. The demand for teamplay is obvious and pressing.

The need for coöperation in research cannot be denied. Research in public health, while it is dependent upon the laboratory, is chiefly a field undertaking. Results should be consistently checked by impartial observers who have no special cause to serve, no preconceived theory to support. A bureau of statistical inquiry which should make objective studies of various public health experiments and demonstrations would render the kind of service which certified public accountants render in the field of business. It has long been recognized as a sound principle that no business enterprise should audit its own finances, and certify its own condition to the public. An English writer in discussing the establishment of a Ministry of Public Health lays stress upon this very point. "Such a Ministry," he says, "should be not so much unifying as coördinating. . . . (It is) mainly in scientific and statistical work that coördination is required." Again, he declares: "Freedom from administration is essential to independence of judgment."* The latter statement especially touches a vital matter. No one who is administering a special undertaking, devoting his time and energy to making it a success and especially no one who is soliciting funds that the experiment may be continued, ought to put himself in the position of appraising the results of his efforts.

Administrative teamplay is essential. The health of a community is, after all, not a group of special interests. It is

* W. A. Brend: "Health and the State," p. 60.

essentially a single interest with different aspects. To exalt one of these, to get it out of focus, and to urge it at the expense of other essential factors, is unscientific, wasteful and misleading. Only as the essential unity of the task is recognized and as those who represent different phases work together in constant conference and in accordance with a comprehensive program, can the best results be secured. The studies which the Russell Sage Foundation has made at Newburgh, Topeka, Springfield (Illinois) and Ithaca, are illuminating and suggestive with reference to this point. The significant undertaking at Framingham is being watched with deep interest.

The importance of teamplay in public health education need not be elaborated in detail. If as a result of independent public health research and careful statistical inquiry, verified knowledge could be secured, and then presented through scientific papers and manuals, popular journals, pamphlets, posters and advertisements which should emanate from a coöperative bureau of popular education in public health, immense gains in accuracy and authority as well as important economies would accrue.† One can imagine also a public health journal of a popular character published under the auspices of such a bureau and given a wide circulation throughout the country. This center would also serve as a press bureau for the periodicals and the daily papers. In close coöperation with the Federal government and state and municipal officials, such a bureau could render enormous service in developing an instructed public opinion to support governmental policies.

Granted what it would seem hard to dispute, the real need for teamplay in research, in administration, and in education, the question arises as to what type of organization might be undertaken with reasonable hope of success. There are two methods of approach—either from the center to the periphery, or from local communities to the nation. It is conceivable that both kinds of effort might be made at the same time. It is easy to sketch on paper a form of national organization. This would naturally include, let us say, an American Public Health Association which should aim at organizing on a national scale a maximum constituency of individuals interested in the promotion of public health. Local chapters would be subordinate to state societies. These in turn would form a part of a national association. Various special groups would form sections, *e. g.*, tuberculosis, child welfare, venereal diseases, public health administration, etc., which would be coextensive with the entire organization. The executive heads of these sections would form an administrative committee which under the guidance of a national council and with the leadership of a full time executive would consider comprehensive programs, submit national budgets and make an appeal for funds. In any such organization federal, state and local officials would naturally be represented. Under the auspices of such a society a bureau of research with its independent statistical service and a bureau of popular education would be conducted.

Difficulties in the way of creating such an organization are obvious. There are groups which would hesitate to merge their individuality. Collective egotism in these days largely takes the place of individual selfishness. Another obstacle would be the fears of individual officers that their services might not be required in the new organization. A third diffi-

† Since this was written the De Lamar bequest has been announced. This will apparently impose upon Harvard, Columbia, and Johns Hopkins an obligation to institute University-Extension activities in hygiene and public health. Are there to be three independent centers of propaganda or are they to develop teamplay and become a national agency?

culty might be found in the prejudice against large dominant organizations to which monopolistic tendencies are attributed. In the fourth place many who are interested in public health would fear the development of bureaucracy and the hampering of that uncontrolled initiative which now runs riot in the public health movement.

All of these objections deserve consideration. The success of any coördinating national agency would depend upon recognizing frankly the special interests in public health which as sections working in constant conference and harmony would perpetuate the individuality of the strongest existing societies. Certainly the men and women who have shown intelligence, ability and devotion in various public health activities should so far from being discarded in a new organization, be given places of greater security and dignity with freedom from the harassing cares of money raising and larger opportunity for actual service. By providing for the election of the various representatives through the chapters and state organizations, a democratic form of control could be secured which would be a protection against the domination of a self-perpetuating inner group. At the same time a council created in part on an *ex-officio* basis and having only advisory functions could exercise through sheer force of personal and institutional prestige an important guiding and steadying influence.

There seems little doubt that if some such coördination of effort could be secured and a comprehensive program worked out, the funds required for the central administration and for the creation of a national reserve fund out of which appropriations could be made toward local and state campaigns, would be forthcoming. It is reasonable to believe that a large membership could gradually be recruited from which fees divided between local budgets and the national treasury could be secured. It is also probable that individuals and institutions who are deeply interested in the promotion of public health, would, especially in the early stages of such a movement, contribute substantial sums to insure a fair trial for the experiment.

In connection with this question of national organization, the peace plans of the American Red Cross ought to be considered. This great organization, which has rendered conspicuous service during the war, has announced its intention to develop a peace program which shall have direct bearing upon public health, the training of nurses, and the "Safety First" movement. The American Red Cross will continue to appeal at Christmas time to the American public for a Christmas gift. It will attempt to maintain a large membership throughout the nation. It is conceivable that this Red Cross might be willing to make an annual appropriation toward the budget of a national public health association. A precedent is this year established in the taking over by the Red Cross of the sale of Christmas seals, and the appropriation *in lieu* of this surrendered perquisite, of the sum of two and a half million dollars to the National Tuberculosis Association.

Or the Red Cross might itself directly undertake to affiliate and coördinate the various public health agencies and to solicit for this purpose funds from Red Cross members and the American public. After meeting all its war obligations, it is understood that the American Red Cross will have substantial resources with which to inaugurate its peace policies. It is an appropriate time, therefore, from every point of view to consider possible relations which the American Red Cross may sustain to a coördinated public health movement throughout the United States.

The other type of teamplay might be undertaken through a considerable number of local demonstrations. Jackson (Michigan), Cincinnati, and Framingham have developed significant forms of local public health organization. In many other places throughout the country visiting nurses' associations, hospital social service departments and other agencies have been working out plans of closer coöperation. During the influenza epidemic many temporary organizations were effected which suggest possibilities for permanent policy. If in a given community the private agencies would work out a comprehensive program of public health, to be carried out over a given period with expert administration, and independent statistical audit, it is altogether likely that a considerable part of the cost might be contributed by institutions which are anxious to foster demonstrations in the field of public health. Such appropriations might extend over a five-year period and diminish by 20 per cent annually so that at the end, the entire expense if the experiment proved successful, would be assumed by the community. If local experiments of this kind were undertaken in a considerable number of places so that substantially all the types of community—urban, village and rural—might be used for demonstration purposes, it is reasonable to assume that the policy of unified public health effort would be furthered.

As has been suggested already, there is no reason why both of these types of teamplay—national and local—might not be undertaken at the same time. There would be a great advantage in creating the central bureau of research and statistical inquiry under the auspices of which the local experiments could be carried out. It is possible that the United States Public Health Service might from the outset be able to coöperate not only in the local undertakings, but in the national program.

It is certain that so long as the voluntary agencies of the country persist in their present policy of isolation and rivalry, seeing their specialties out of focus, unconsciously misleading the public, hampering the development of unbiased research, preventing the consistent and careful education of the public mind, they will be in no position to bring to bear upon the Federal government pressure for the creation of a federal department of health with a secretary of health in the cabinet of the President.

On the other hand, the development of thoroughgoing teamplay among voluntary agencies in close coöperation with the federal and state authorities, ought with the education of the public, to lead inevitably to the establishment in Washington of a national department of public health which without imposing its authority unduly upon states and communities, would through its research activities and its comprehensive programs guide all the forces of public health throughout the nation.

How is the present equilibrium of individualism and tradition to be upset? Are we to go on into times of peace forgetting all the lessons of teamplay which have recently been forced upon us? It is certainly worth while to make an effort to bring about a change. The American Public Health Association certainly has a name which a national society might well bear. It is the pioneer in the movement. It is interested in the whole program of public health and not committed to any one aspect of it. The American Public Health Association includes a large part of the leadership upon which the success of any plan of teamplay would depend. Could not the Association suggest or approve a conference of officers of the leading public health organizations together

with men and women of recognized status whose chief interest is not in the welfare of any one society but in the promotion of the health of the American people through the most effective machinery that can be set up? The aim of such a conference would be to formulate one or more plans for submission to the various associations concerned. Or better still, perhaps would not this society favor the appointment of a commission of disinterested public health leaders to study the problem, confer with the several groups involved, and formulate a solution?

The problem seems to be very much that of church unity, only it is to be hoped not quite so apparently insoluble. Just as no one church can expect all the others to accept its creed and authority as a basis of unity, so no one of the public health agencies can invite the others to merge themselves in it. The essential thing in teamplay is that each participant shall not lose his identity but shall subordinate his individual purposes to the common interest, and shall do his part loyally in accordance with a plan which is accepted by all and which gives unity and efficiency to the combined endeavor. When we think of the inspiring rhetoric in which we have indulged during the last few months, the exaltation of the national welfare, the sacrifice of the individual to the group, etc., can we with complacent equanimity contemplate the continuance of a state of affairs which however defensible in pioneer days has become an obstacle to progress in one of the most fundamental of our national needs?

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LIVE IN THE OPEN.

This little pictorial hint, fresh from the campaign in France against tuberculosis and infant mortality, shows how admirably and artistically the work is being carried on. The psychology of apt illustration is a strong weapon in the hands of the united forces that are carrying on this work, the International Health Board, the Red Cross and the French Government.

A strong force of Americans has been at the head of the movement, which has been carried on with great energy, using the customary American methods of publicity and education adapted to the tastes and customs of the people. This is one of the picture postal cards that have been widely distributed. Its legend, "Live in the open as much as possible," is made more telling and the surprise of the dog in discovering the snail attracts attention even of the youngest, and children have been especially considered in this great educational campaign.

THE WORK OF THE ILLINOIS INFLUENZA COMMISSION.

Read before the American Public Health Association, Chicago, December 9–12, 1918.

INFLUENZA, in epidemic form, invaded Illinois during the early part of September, appearing almost simultaneously at two places in the state, one in the extreme northern portion and the other in the extreme southern portion, with an intervening distance of about four hundred miles. One of these points of invasion was the Great Lakes Naval Training Station, housing upward of 50,000 young men. The other was the village of Elko, Alexander County, a community with relatively small but congested population.

Elko was off the line of great avenues of travel, surrounded by a territory not thickly settled and made up of a population which had only slight interchange with other communities. In this community, the epidemic quickly ran its course and was almost forgotten in the state-wide epidemic which spread over Illinois during October and November and which remains in at least twenty counties at the present time, reappearing in some sections where it had appeared that the danger was entirely passed. There is reason to assume, from the history of the epidemic, that the prevalence of the disease in southern Illinois, a number of weeks later, was due to the great wave of infection that spread from the northernmost limits of the state rather than from the early point of invasion in southern Illinois.

The Great Lakes Naval Training Station, on the other hand, is situated in a thickly settled portion of Illinois, close to her largest city, on main lines of travel and with a population which, under normal conditions, had continuous intercourse with a widespread and thickly populated area of the state.

By September 22, the epidemic had made its first impression upon the mortality of the City of Chicago and by October 1, the disease had appeared at Camp Grant where it spread with great rapidity and with very high mortality. The fact that the disease thus appeared so early during the epidemic in two large military camps is interesting in view of the fact that in sixty-four Illinois counties offering explanations as to their source of infection, thirty-one declare that their first cases came from military camps and cantonments.

On September 25, the State Department of Public Health promulgated rules and regulations for the control of influenza making all cases reportable by physicians, nurses, school authorities, hospital and institutional officials, householders and other officials and requiring the isolation of all known or suspected cases and specifying precautionary measures.

On September 28, there was created, at the instance of the Council of National Defense, the Illinois Influenza Commission, made up of representatives of the Army, the Navy, the United States Public Health Service, the American Red Cross, the State Department of Public Health, the Health Department of the City of Chicago with others interested in public health activities. This commission held almost daily conferences until after the disease had reached its crest in the northern part of the state. To keep in close touch with these conferences and to meet the needs as they developed in northern Illinois, the State Department of Public Health established offices in Chicago which were maintained for a period of about six weeks.

From the Great Lakes, the epidemic spread as a great fan-shaped wave south-

ward and westward, the daily and weekly spot maps making an interesting picture. With remarkable uniformity this wave proceeded out through the state, but with narrow lines extending in advance along the greater trunks of travel, often describing actual curves in accordance with the course of the principal railways.

Almost at once it was found that there were many communities seriously stricken, where the medical forces had been greatly depleted through military enlistment and where nurses were almost unobtainable.

About October 9, the State Department of Public Health received a telegraphic communication from the Surgeon-General of the United States Public Health Service recommending that all places of public gathering throughout the state be closed. The recommendation was immediately transmitted by wire to all public officials but, inasmuch as the disease had not extended in epidemic form beyond the northern portions of the state and had not appeared at all in the vast majority of counties, the suggestion was added that this recommendation be applied as the needs of the individual community seemed to require.

By this time, there had been established in the Chicago offices of the Department of Public Health a division for the assignment of physicians to the peculiarly afflicted communities, this being carried out through a generous financial provision by the United States Public Health Service. A similar arrangement had also been perfected for the provision of nurses through the Central Division of the American Red Cross.

On October 2, revised and more rigid rules for the control of influenza were promulgated by the State Department of Health and, on October 12 and 16, after conference with the Illinois Influenza Commission, orders were issued prohibiting public dances and public funerals together with all gatherings of a social nature not necessary to the war. These orders, in a more specific way, provided for the closing of night schools, theaters and motion-picture houses, lodge meetings, stocks sales and other public gatherings of well-defined character. Schools were permitted to remain open on condition that there was adequate medical school inspection. Churches were not ordered closed; but church authorities were urged, as good citizens, to restrict meetings to the lowest possible point, while church ventilation, the prevention of crowds and the rejection of persons suffering from acute colds were insisted upon.

In connection with the churches, it was felt that there was definite need for an outlet for the public emotion which was clearly manifesting itself in connection with the epidemic and, for the most part, the churches seem to have manifested good judgment and, incidentally, good citizenship, in handling their people.

The wisdom of the attitude in regard to public schools seems to be borne out by subsequent developments. It is by no means manifest that the closing of schools and the dismissal of children into the communities had any effect in checking the spread of the disease. On the other hand, medical inspection doubtless brought to light thousands of cases which otherwise would have received belated medical attention, if any at all, while the first experience with school inspection and with school nurses, incidental to the epidemic, has convinced scores of Illinois communities of the wisdom of making medical school supervision a permanent matter.

It will be recalled that the epidemic reached Illinois in the midst of a most important political campaign preparatory to a senatorial election. Orders were not issued in regard to political meetings, other than the general orders

to which reference has already been made; but a letter was written to the state chairman of each of the political parties with the result that the campaign was conducted entirely without public gatherings. In this, there was the heartiest coöperation and not one word of protest.

In a state four hundred miles in length, with the epidemic beginning almost at the northern boundary and extending gradually south, it was exceedingly difficult effectively to apply state-wide rules and regulations. At the time the disease had practically disappeared from a northernmost section, the first case had not appeared in a community farther south, so that demands for release from regulatory restrictions, based upon perfectly valid reasons, were received in the same mail that carried protests from other sections against regulations on the ground that no evidence of the disease had as yet appeared.

On this account, it became apparent that the Department of Public Health must be kept constantly advised of existing conditions in every community in the state and, on October 12, local authorities were instructed to forward daily telegraphic reports.

At the same time, all communities were advised that all rules and regulations would continue effective until abatement of such regulations for the individual community should be specifically approved by the State Department of Health, based upon a statement of local conditions, to be furnished on a blank provided for that purpose and signed by the mayor and health officer.

From the onset of the epidemic, up to and including November 30, reasonably active reports from 1,348 Illinois health jurisdictions within which is embraced 60 per cent of the total population of the state, show 193,885 reported cases of pneumonia and influenza, 53,000 of which were in Chicago. In the same areas the reported deaths numbered 13,466 of which 9,129 occurred in Chicago.

Assuming that similar ratios obtained among the other 39 per cent of the population, the total of reported cases in the state, during the eleven weeks ending November 30, was approximately 323,150, with deaths amounting to a staggering total of 22,445.

If it is true, as is quite universally believed, that the reported cases represent not more than 25 per cent of the actual number occurring, the number of cases developed in Illinois in the eleven weeks was approximately 1,300,000.

The proportion of deaths to reported cases for the state as a whole was 6.9 per cent. Down state records show a 3.1 per cent death-rate and Chicago figures indicate a 17.2 per cent death-rate. Figured on the basis of estimated actual cases, rather than on the incomplete total of reported cases, the death-rate for the state was less than two per one hundred cases.

As previously stated, the disease still prevails in epidemic form in some twenty counties of the state, with recurrences in many communities in which the crest was supposed to have been reached a number of weeks ago, so that the total toll in morbidity and mortality for the State of Illinois cannot be even estimated at the present time. It is quite likely that the effects of the epidemic will make themselves apparent in the mortality and morbidity figures of 1920 if not of 1921.

Among the more interesting features of the epidemic of Illinois and perhaps the most important from an economic standpoint, was the tendency to explosive and virulent outbreaks in the large mining centers of the state's great coal fields. The housing conditions in these coal mining centers are exceedingly bad and

these have been rendered even worse by the great pressure that has been brought to bear upon the coal industry through war-time demands. In a number of these mining communities from 60 to 70 per cent of the entire population were afflicted within the first few days of the invasion of the disease and it became necessary in many such communities to supply medical and nursing care and to assume practical control of local health and medical conditions.

During the progress of the epidemic, the State Department of Public Health availed itself of the supplies of immunizing vaccine generously furnished by the Illinois Influenza Commission and by the City of Chicago.

These were distributed from the offices of the Department at Springfield with the following order of precedence: First, to exemption boards for use with Class A registrants; second, to physicians and nurses actually engaged in the care of influenza and pneumonia patients; third, to employees in industries essential to the successful pursuit of the war, and, fourth, to the public at large.

Within the past ten days, through questionnaires sent to the 102 counties of Illinois outside of the City of Chicago, an effort was made to ascertain, in addition to the morbidity and mortality of the disease, the effect of the epidemic upon medical and nursing service and the general attitude on the part of the physicians of these counties in regard to the use and value of immunizing vaccines. It is obvious that the returns, so far as information on the results of the use of immunizing vaccines are concerned, are of no scientific value and, at most, indicate merely popular belief or prejudice. However, with the epidemic not yet abated, an idea of this local impression is not without its practical value.

So far as medical and nursing service were concerned, it was found that the medical forces of the reporting counties had been depleted to the extent of 696 physicians who had gone into military service. Of these, 311 were victims of the epidemic with a total death roll of 24. Of the equally depleted forces of nurses, 356 were afflicted by the disease and 34 died.

It was found that no preventive vaccine had been used in 21 counties and that it had been employed only to a moderate extent in 72 counties Only four counties in the state claimed its general employment. In addition to the vaccine furnished by the Illinois Influenza Commission and the Chicago Health Department, ten others were employed.

As to whether or not these vaccines had served to prevent the spread of infection, 19 counties offered no definite opinion, 29 answered in the affirmative, 27 were of divided opinion and 16 regarded the vaccines as of no preventive value.

Regardless of definite opinions as to the general value of vaccines, based upon the experiences of these counties, the following figures were gleaned from these very interesting but highly unreliable questionnaires: Counties in which there were no cases after vaccination, 23; counties claiming partial protection, 7; counties in which the severity of the disease was decreased by vaccination, 21; counties claiming prevention of pneumonia but not of influenza by vaccination, 1; counties reporting influenza after vaccination, 24; counties claiming pneumonia after vaccination, 4; counties claiming deaths after vaccination, 4; counties claiming absolutely no preventive value, 4; counties claiming disease increased by vaccination, 2.

Illinois Influenza Commission,
R. A. O'Neill, M. D., *Chairman.*
C. St. Clair Drake, M. D.
J. O. Cobb, U. S. P. H. S.

THE DISTRIBUTION OF INFLUENZA BY DIRECT CONTACT —HANDS AND EATING UTENSILS.

COL. CHARLES LYNCH,
Medical Corps, U. S. A.
and
LIEUT.-COL. JAMES G. CUMMING,
Medical Corps, U. S. A., Port of Embarkation, Newport News, Va.

Read at the Annual Meeting of the American Public Health Association, December, 1918, at Chicago, Ill.

THE object of this paper is to present the results of an investigation of the incidence of influenza, which results show that the major route of transmission of this infection is by indirect contact. The investigation covered troops stationed at the Port of Embarkation, Newport News, Va.—reported October 19, 1918*—also those at Langley Field, Fortress Monroe, Lee Hall Balloon School, and Camp Lee—a total of over 66,000 troops.

There are two distinct methods of messing troops, and this factor was taken advantage of in making a study of transmission by indirect contact. So the troops are divided into two groups according to their respective method of messing: the one group eating from tableware or mess kit equipment, which is washed in boiling water, and the other group eating from mess kits which are washed by the old line method. The old line method consists in each soldier washing his own mess equipment in water used by other members of the organization. This dishwater common to approximately 200 men was inadequate in amount, never at the boiling point, but usually having a temperature between 40° C. and 50° C. When the common dishwater used by troops is not kept at or near the boiling point, its bacterial content rapidly increases with the washing of each successive mess equipment. In addition to the organisms transferred from the mouth through the mess equipment to the wash-water, this number is added to from contaminated hands, for almost invariably the hands are used as mops when the water is tepid. So then, the contamination of mess kit wash-water by mouth organisms is by two routes of travel; namely, from the mouth to mess equipment, thence to wash-water, also from the nose and mouth to the hands and thence to wash-water.

As each soldier contaminates the wash-water with his own variety of bacteria he at the same time contaminates his mess equipment and his hands with organisms introduced into the water from the mouths of other soldiers. Each successive man as he washes his mess equipment not only adds to the contamination of the wash-water, but with this accumulative contamination there is increased contamination of his washed mess equipment and his hands with organisms from the mouths of other men, and these new varieties of organisms naturally gain access to his mouth either through the mess equipment or the hand route of travel. The viability of the organisms picked up from the wash-water by the mess equipment may be reduced by desiccation before the next meal, but the hand, recently contaminated with the mouth organisms of others, visits the nose and mouth frequently, resulting in the introduction of newly acquired varieties of bacteria.

The possibility then of exchange of the organisms of mouth-borne diseases might

* Lynch and Cumming, "The Rôle of the Hand and the Transmission of Influenza Virus and Secondary Invaders." *The Military Surgeon*, December, 1918.

SERIES B, TABLE A, CAMP STUART.

TROOPS USING TABLEWARE OR MESS KITS WHICH ARE BOILED.

Organization	Strength Sept. 30	Oct. 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	Total
Detachment																							
Ordnance Depot	63	0	0	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3
Med. Det.																							
Med. Sup. Depot	240	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	3
382 Bakery Co	89	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	3
405 Res. Lab. Bat.	239	0	1	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	4
Troop D, 11th Cav	105	2	1	2	1	1	3	0	2	5	1	0	0	0	0	0	0	0	0	0	0	0	19
Mal. Drainage Det	241	1	1	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
	241	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	977	3	4	4	3	2	6	4	2	4	5	2	0	0	1	0	0	1	0	0	0	0	41
MESS KITS WASHED BY OLD LINE METHODS.																							
347 Labor Bat	1,136	0	0	0	0	0	16	69	166	15	14	19	1	12	1	6	2	0	2	0	6	0	329
322 Guard & Fire Co	99	2	1	1	5	2	0	2	1	0	1	1	0	0	0	0	0	0	0	0	0	0	16
324 Guard & Fire Co	194	2	1	3	0	0	5	0	1	1	3	1	0	0	1	0	0	0	0	0	0	1	24
225 Guard & Fire Co	199	2	1	3	1	0	0	0	1	0	2	1	1	0	1	0	1	1	1	1	1	0	18
Port Utilities																							
Q. M. Corps	63	1	0	0	1	0	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	7
386 Mach. Shop Unit	25	1	0	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	4
Total	1,716	8	3	8	7	2	23	73	168	18	18	26	3	14	2	8	2	3	1	7	1	1	398
Grand Total	2,693																						439

be remote if such exchange existed at only a single meal, but this is not the case, for so long as the organization remains intact and washes its mess equipment in tepid water, the chances of exchange exist not only a single time on a single day, but three times a day over a long period. Furthermore this exchange is not limited to a small group of say three to five men, but to a very large group, composed of a company of 250 men. In a large group such as this there is increased opportunity for the interchange of pathogenic bacteria, for the larger the group, the greater the possibility of carriers, and the more highly contaminated is the water. Warm dishwater is then the most intimate and frequent point of contact among troops for the exchange of mouth organisms.

On the basis of the foregoing hypothesis the following charts and laboratory experimentations are presented:

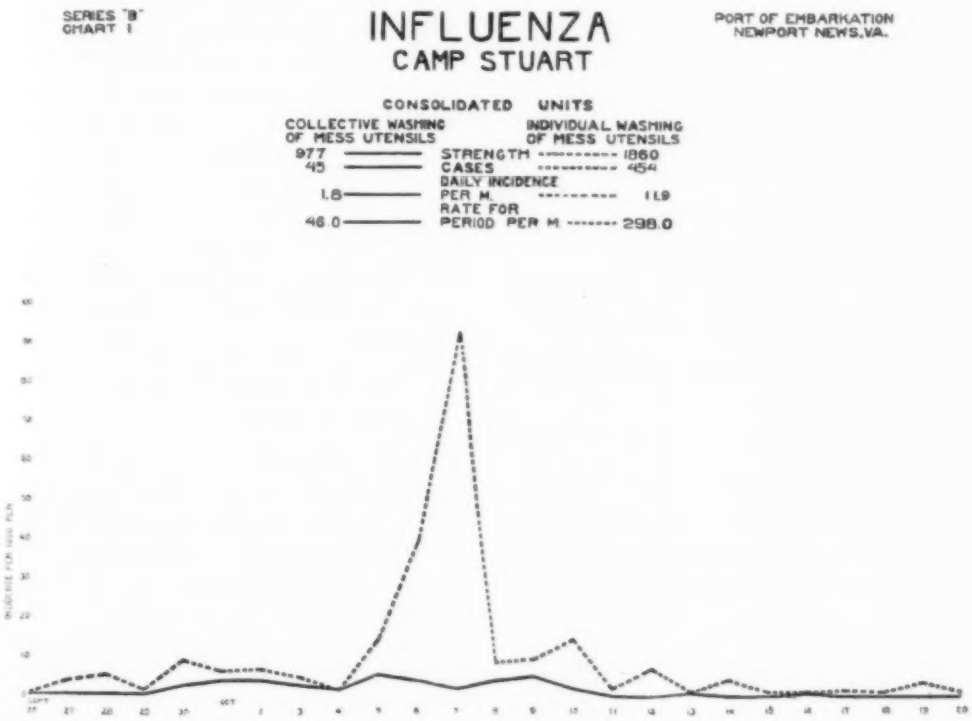
Camp Stuart

Series B, Chart I, Table A.

Camp Stuart, one of the debarkation camps of the port, has approximately 3,000 permanent troops. Some of these eat from tableware, others eat from mess kits. Some organizations washed their mess kits in boiling water, which was kept over fire, others washed theirs by the old line method. So these troops are grouped according to whether or not the chain of transmission by indirect contact through mess kit wash-water was broken by the use of boiling water.

In the group of 977 troops which eat from tableware or mess kits which are washed in boiling water there were 45 cases, giving a rate for the period of the epidemic of 46 per 1,000, while in the other group of 1,860 troops which washed their mess equipment by the old line method in tepid water there were 454 cases, giving a rate of 298 per 1,000.

When these two groups are compared it is found that there are 84 per cent more cases in that group in which the chain of transmission by indirect contact was not broken because tepid mess kit wash-water was used. In the one group there was a continuous low grade daily incidence during the entire period of the epidemic. In the other group, in addition to a period of low grade epidemicity, there was an explosive outbreak, indicative of mass infection for a large number of individuals by indirect contact. The rapid rise, the high peak—93 per 1,000—can be accounted for only by indirect contact transmission.



SERIES B, CHART I.

CAMP LEE

Series B, Chart II, Table B.

A study of the influenza epidemic at Camp Lee is of particular interest in that this is a mobilization camp, composed for the most part of training troops. The troops are chosen for the most part because of their exceptional physique and intelligence. For the purpose of the investigation, 26,223 troops are grouped into those using tableware and those using mess kits. Of those using tableware the troops of the Officers' Training School of over 5,000 has a low grade incidence of the infection notwithstanding the fact that they were in close association in crowded class rooms during most of the day. At no time was the daily incidence over 10 per 1,000. On the other hand the Infantry Replacement and Training Troops and the Veterinary Training Troops,—16,364 troops,—who were for the most part in the open and among whom there was no crowding except when

SERIES B, TABLE B, CAMP LEE.

TROOPS USING TABLEWARE OR MESS KITS WHICH ARE BOILED.

Organization	Strength	Oct. 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	Total
School for Cooks and Bakers	1,250	4	5	1	5	0	3	6	4	0	3	0	5	3	1	0	0	0	1	0	0	0	0	0	0	0	41
Base Hosp. M. Dept.	1,133	0	0	3	8	15	4	3	4	0	0	16	4	6	1	5	3	6	0	2	5	2	1	6	1	3	98
Q. M. Corps	948	0	17	9	5	0	3	13	9	9	3	3	7	0	3	0	6	2	2	1	0	1	0	2	1	0	96
Officers Training School	6,528	57	65	59	33	27	21	24	21	16	12	11	5	8	6	10	1	8	4	3	3	2	3	2	3	3	401
Total	9,859	61	87	72	51	42	31	46	38	25	18	30	21	17	11	15	10	16	7	6	8	5	4	10	5	6	642
MESS KITS WASHED BY USUAL LINE METHOD.																											
Vet. Training School	4,293	10	16	42	67	116	118	184	229	390	260	305	202	135	37	25	24	10	11	9	7	0	0	0	1	1	2,199
Inf. Repl. & Tr. Camp	12,071	38	37	40	41	58	58	44	84	150	211	435	306	256	219	269	295	195	184	171	96	83	60	64	48	43	3,485
Total	16,364	48	53	82	108	174	176	228	313	540	471	740	508	391	256	294	319	205	195	180	103	83	60	64	49	44	5,684
Grand Total	26,223																										6,326

they were off duty, had a daily incidence which in one group reached 87 per 1,000. If crowding or continuous association had been a large factor in transmission the higher incidence should have been among troops of the Officers' Training School. This is not the case,—the higher incidence was found among those troops which used mess kits and washed them by the old line method. In fact, the rate of infection was five times greater in this group.

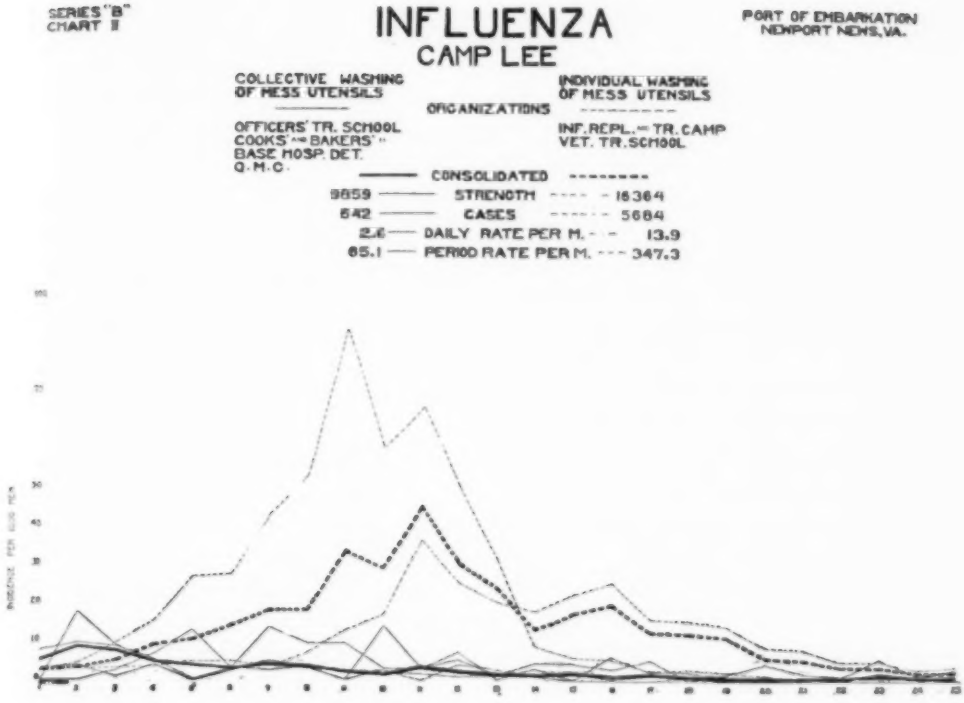
This is not an isolated example of low daily incidence among troops in which there is continuous close association, and supposedly much transmission by direct contact. Our investigation of influenza among 6,000 troops shows that direct contact infection through the air route is only subsidiary to the major and minor routes by indirect contact through the touch route.

Lee Hall Balloon School

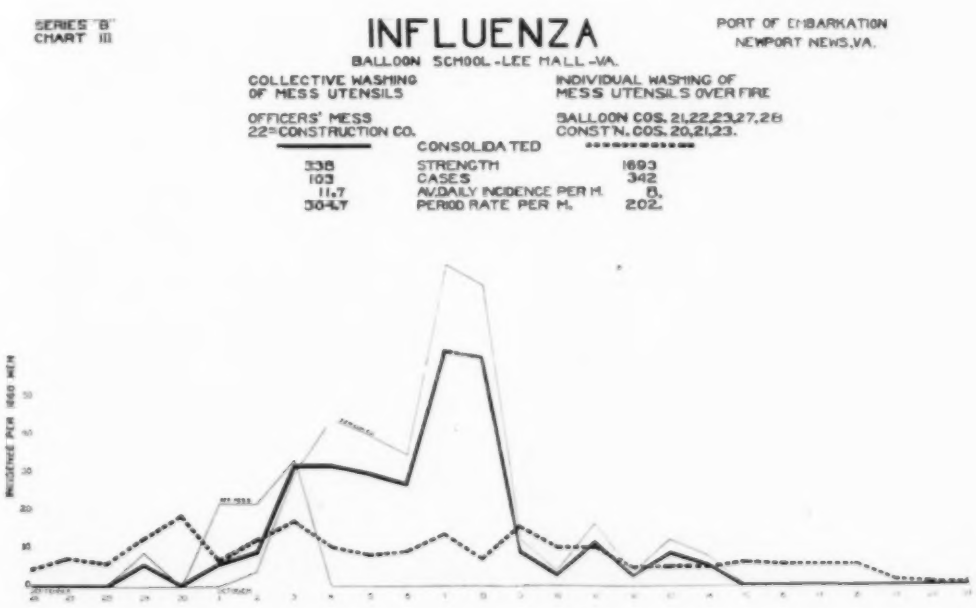
Series B, Chart III, Table C.

The investigation at Lee Hall Balloon School is peculiar in that there is a higher rate of infection among those using tableware than among those using mess kits. This is one of two exceptions which we have found in our investigations. The rate for 338 men who used tableware was 304 per 1,000, and for 1,693 men who used mess kits there was a rate of 202 per 1,000. As a possible explanation of this finding it may be said that in several instances the epidemiology of the infection has led us to believe that it may be food-borne. If this is the case we have ready explanation of the explosive outbreak among those using tableware, for in addition to one cook, three kitchen helpers developed the infection early in the epidemic.

Among troops using mess kits there was a comparative low daily incidence and no sharp outbreak. The rate is moreover much higher than would be expected, for



Series B, Chart II.



Series B, Chart III.

SERIES B, TABLE C, LEE HALL BALLOON SCHOOL.

TROOPS USING TABLEWARE.

Organization	Strength	Sept. 26	27	28	29	30	Oct. 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	Total
22 Const. Co.	248	0	0	0	2	0	0	1	8	11	10	9	21	20	3	1	4	1	3	2	0	0	0	0	0	0	0	96
Officers Mess	90	0	0	0	0	0	2	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
Total	338	0	0	0	2	0	2	3	11	11	10	9	21	20	3	1	4	1	3	2	0	0	0	0	0	0	0	103

TROOPS USING MESS KITS WHICH ARE BOILED OVER FIRE.

21st Bal. Co.	193	4	3	3	9	18	2	4	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	46
22nd " "	191	0	0	0	1	2	0	0	1	2	1	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	15
23rd " "	197	1	0	0	1	3	1	2	1	1	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	13
27th " "	179	1	3	6	4	8	4	1	6	1	2	2	5	0	5	1	2	0	0	0	0	0	0	0	0	0	0	51
28th " "	184	0	1	0	2	3	1	0	4	5	0	5	9	0	4	5	0	0	0	3	2	1	0	0	0	0	0	45
20th Const. Co.	251	0	3	0	1	0	2	3	5	4	1	4	5	0	2	0	4	3	0	2	1	1	1	1	0	1	0	44
21st " "	250	1	2	0	2	2	1	3	1	1	4	1	1	4	2	1	2	1	1	0	2	1	3	5	1	0	1	43
23rd " "	248	0	0	0	0	0	0	7	6	1	5	0	1	4	11	8	8	4	7	3	5	6	5	3	1	0	0	85
Total	1,693	7	12	9	20	36	11	20	26	16	13	15	23	11	26	16	16	8	8	8	10	9	9	9	2	1	1	342
Grand Total	2,031																											445

SERIES B, TABLE D, FORTRESS MONROE AND LANGLEY FIELD.

TROOPS USING TABLEWARE OR MESS KITS WHICH ARE BOILED.

Organization	Strength	Sept. 30	Oct. 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Total
Fortress Monroe	12,500	54	47	54	55	43	66	73	48	39	38	37	27	38	18	21	26	13	28	24	17	19	16	17	9	827

MESS KITS WASHED BY USUAL LINE METHOD.

Langley Field																										
28th Co.	205	1	2	2	0	3	2	1	12	27	2	11	0	1	5	1	1	0	0	0	0	0	0	0	0	71
29th Co.	206	2	0	2	0	2	6	2	3	13	0	15	1	1	1	0	0	0	0	1	0	0	0	1	0	50
30th Co.	206	0	0	0	0	0	0	2	0	11	0	25	0	1	1	0	1	1	0	0	0	0	0	0	0	42
31st Co.	206	0	0	0	1	3	2	0	3	15	1	6	0	3	2	0	0	1	0	0	0	0	0	0	1	38
Total	823	3	2	4	1	8	10	5	18	66	3	57	1	6	9	1	2	2	0	1	0	0	0	1	1	201
Grand Total	13,323																									1,028

this group was supposed to wash their mess kits in boiling water kept over a fire box. The fire, however, was not sufficient to keep the water in all containers hot. Often the water would be only tepid, and occasionally the rinse water would not be kept over fire. It is essential that the contents of the several containers of mess kit wash-water be kept at or near the boiling point. If the contents of all the G. I. cans are kept boiling, hand contamination does not take place and there is no accumulative contamination of the water.

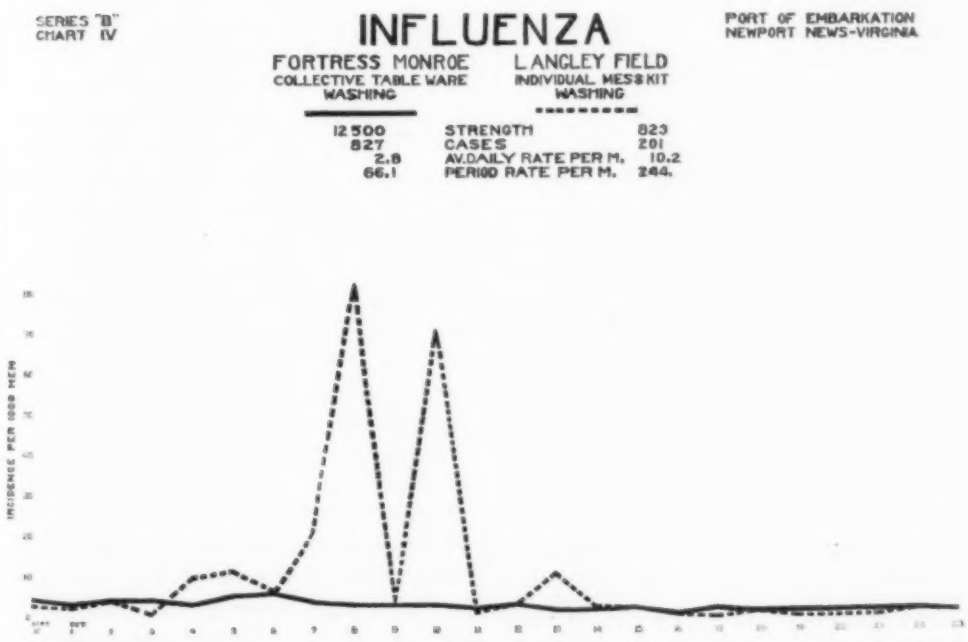
Fortress Monroe and Langley Field

Series B, Chart IV, Table D.

At Fortress Monroe the troops consisted of the C. A. C.—strength 3,500—and a training school of 8,500 troops. All these troops were quartered in barracks and ate from tableware. At Langley Field there were 823 troops, composed of labor organizations. These were housed in barracks and ate from mess kit equipment which was washed by the old line method.

Although these two groups belong to different army branches they were not far distant one from the other, both had intimate association with the same civil communities, and from the sanitary point of view the method of messing was the only outstanding feature of difference between them.

At Fortress Monroe where tableware was used the highest daily incidence of the infection was 6 per 1,000 as contrasted to 83 per 1,000 at Langley Field where mess kits were washed by the old line method. At Fortress Monroe the rate of infection per 1,000 strength was 66.1 as against 244 at Langley Field—and an increased incidence in the latter group over the former of 73 per cent.



Series B, Chart IV.

Consolidation of Series A and B, Chart V, Table E.

The consolidated chart in addition to those posts here reported, includes a study of six, which have been previously reported, in the *Military Surgeon*, December number, 1918. A consolidation of these two series, A and B, gives a total of 66,076 troops. These are about equally divided according to their respective methods of messing. There was a total of 33,452 officers and men who ate from tableware. The rate of infection for this group was 51.1 per 1,000; while in the other group comprising 32,624 men, who ate from mess kits, the rate of infection with its paralleling high mortality was 252 per 1,000. The ratio of cases in the two groups is 1 to 5, an increase of 80 per cent in that group in which the chain of transmission by indirect contact through contaminated mess kit wash-water was not broken.

Let us consider the incidence of pneumonia from the standpoint of sanitary messing facilities. Troops at Camp Alexander are colored and composed of stevedore and labor organizations. As only physically fit men were to be sent overseas it became necessary to form so-called reserve labor battalions of such men as had chronic infections and physical disabilities. These organizations performed certain duties at the port, while at the same time they were given medical attention with the idea of reconstruction. Three reserve labor battalions of physically unfit men were formed at Camp Alexander in February. They numbered approximately 3,600. The sanitary situation was such that these three battalions were provided with incinerators. In these, facilities were provided for boiling mess kit wash-water. The remaining troops in this camp, composed of from 3,500 to 4,000 healthy stevedores, washed their mess kits by the old line method in warm water. The numerical strength of these two groups is approximately the same. Their living conditions were as nearly the same as could be—with one exception. The reserve labor battalion washed their mess equipment in boiling water; while the stevedore battalions washed theirs in warm water. For the period from March to November 1st there were but 10 deaths from pneumonia in the reserve labor battalions while on the other hand in that organization in which the chain of transmission was not broken by boiling water, there were 81 deaths from this infection, a ratio of 1 to 8 or 89 per cent more deaths among the stevedores than among the physically unfit labor battalions. The ratio of influenza in these two organizations was 1 to 12 and this incidence, as will be noted, parallels closely the ratio of deaths in the two organizations.

Streptococcus pneumonia was the great scourge of our army last winter. It caused more deaths as a complication of measles than all other infections combined. In our examination of 145 removed tonsils, hemolytic streptococci were found in 82 per cent. They are not the primary cause of disease, but lie in wait for the primary virus infections—as influenza, measles, or scarlet fever—to prepare the soil for the entrance of secondary invaders. The virus infections *per se* are not fatal, but their chief characteristic is that of lowering the body resistance for the fatal secondary invaders—pneumococcus, streptococcus hemolyticus and viridans.

Remarkable as it may seem, the latter are more fatal during the winter season, which is the season of highest prevalence of the virus infections. In fact these virus infections are but rarely complicated in the summer, while in the winter there are approximately 12 per cent complications, and a mortality as high as 82 per cent.

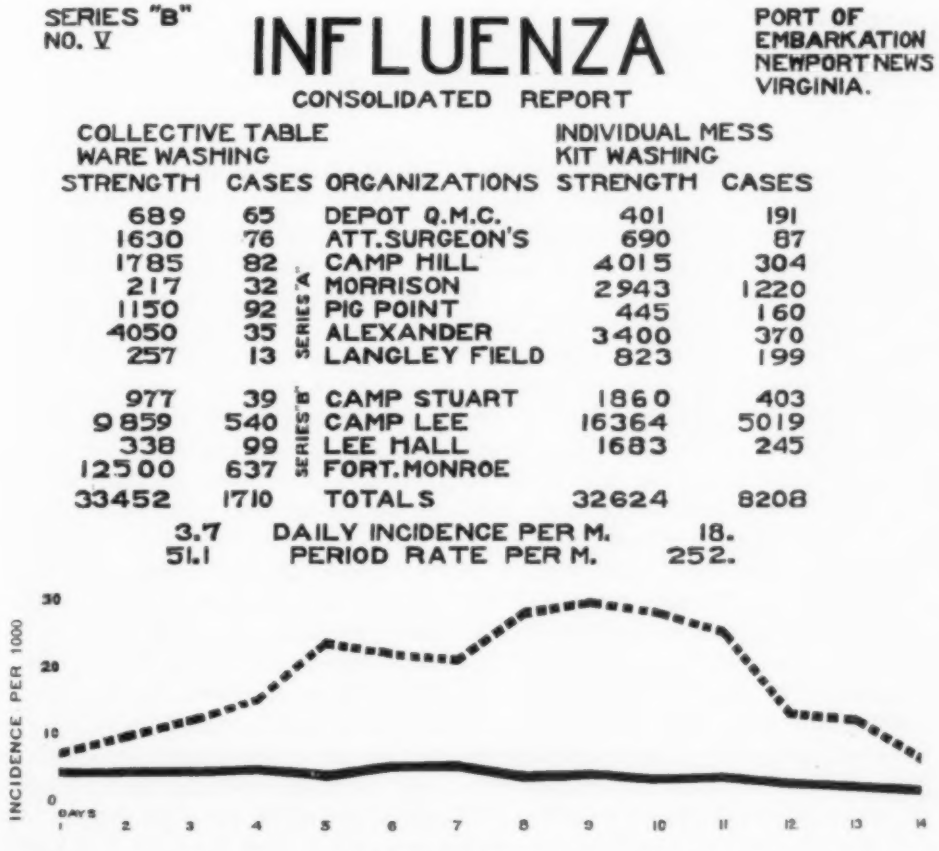
SERIES B, TABLE E, CONSOLIDATION SERIES A AND B.

TROOPS USING TABLEWARE OR MESS KITS WHICH ARE BOILED.

Organization	Strength	Days 1	2	3	4	5	6	7	8	9	10	11	14	13	14	Total Cases
Lee Hall	338	0	2	3	11	11	10	9	21	20	3	1	4	1	3	99
Camp Stuart	977	3	4	4	3	2	6	4	2	4	5	2	0	0	0	39
Fortress Monroe	12,500	54	47	54	55	43	66	73	48	39	38	37	27	38	18	637
Langley Field	257	0	0	0	0	0	0	0	2	1	0	4	0	4	1	13
Camp Alexander	4,050	1	3	1	0	8	1	1	8	10	2	1	3	0	4	35
Pig Point	1,150	2	1	0	16	6	13	10	6	5	5	18	6	4	0	92
Morrison	217	4	4	5	1	4	6	2	2	1	1	2	0	0	0	32
Camp Hill	1,785	1	3	3	8	5	6	7	7	1	4	12	17	7	1	82
Surgeon's Office	1,630	3	0	3	3	9	9	8	9	17	5	5	4	1	0	76
Q. M. C. Corps	689	2	3	1	9	2	7	9	4	3	5	5	6	3	6	65
Camp Lee	9,859	73	78	77	48	37	43	41	28	22	31	27	11	13	11	540
Total	33,452	143	145	151	154	127	167	164	117	123	99	114	78	71	44	1,710

MESS KITS WASHED BY USUAL LINE METHOD.

Lee Hall	1,683	34	11	20	28	16	13	15	23	11	26	16	16	8	8	245
Camp Stuart	1,860	17	12	13	9	3	27	73	170	17	18	27	4	14	3	403
Langley Field	823	3	2	4	1	8	10	5	18	66	3	57	1	6	9	199
Alexander	3,400	12	79	73	73	17	25	7	23	25	10	6	7	9	4	370
Pig Point	445	3	5	3	15	8	24	16	11	18	9	18	7	11	12	160
Morrison	2,943	103	72	71	60	119	141	94	164	83	130	162	13	0	0	1,220
Camp Hill	4,015	0	1	0	10	6	9	9	19	35	132	18	22	26	17	304
Att. Surgeon's	690	3	0	2	1	5	5	8	9	12	11	4	0	22	5	87
Q. M. Corps	401	4	22	13	20	18	31	17	19	11	17	4	3	9	3	191
Camp Lee	16,364	54	102	192	278	551	424	440	439	659	555	500	386	306	133	5,019
Total	32,624	233	306	391	495	751	709	684	895	937	909	812	459	411	194	8,208
Grand Total	66,076															9,918


SERIES "B"
NO. V
INFLUENZA
CONSOLIDATED REPORT
PORT OF EMBARKATION NEWPORT NEWS VIRGINIA.
COLLECTIVE TABLE WARE WASHING
INDIVIDUAL MESS KIT WASHING
STRENGTH CASES ORGANIZATIONS STRENGTH CASES
689 65 DEPOT Q.M.C. 401 191
1630 76 ATT. SURGEON'S 690 87
1785 82 CAMP HILL 4015 304
217 32 MORRISON 2943 1220
1150 92 PIG POINT 445 160
4050 35 ALEXANDER 3400 370
257 13 LANGLEY FIELD 823 199
SERIES "A"
977 39 CAMP STUART 1860 403
9859 540 CAMP LEE 16364 5019
338 99 LEE HALL 1683 245
12500 637 FORT. MONROE
SERIES "B"
33452 1710 TOTALS 32624 8208
3.7 DAILY INCIDENCE PER M. 18.
51.1 PERIOD RATE PER M. 252.
INCIDENCE PER 1000
30
20
10
0
DAYS
1 2 3 4 5 6 7 8 9 10 11 12 13 14

SERIES B, CHART V.

In civil life only 5 per cent of average throats harbor hemolytic streptococci. On the other hand, among troops, we found that 35 per cent of measles cases harbored this organism upon entering the hospital; 85 per cent of these developed streptococcus pneumonia as a complication of measles, and during the month of January 82 per cent terminated fatally. Why this epidemic of measles and its fatal streptococcus pneumonia among troops? If warm mess kit wash-water is, as we have shown, responsible for approximately 80 per cent of the cases of influenza can it not be concluded from our experiences in isolating streptococci almost invariably from the hands of streptococcus carriers, that the epidemic of streptococcus pneumonia was due to the facility of transmission through the mess kit wash-water?

Hand Contamination.

As a further support of our contention that the spread of mouth borne infections is chiefly by indirect transmission the following experimental evidence is presented:

This work was undertaken but recently, and although a total of 160 separate experiments have been made the results of these are given only in general terms. In warm weather, when a number of men wash their hands in warm clear water for a period of 30 seconds, each man contributes 500,000 organisms and in cold weather each man contributes 2,000,000 at a single washing. If warm, soapy water is used this number is increased to 4,000,000 on warm days, while on cold days the number is 240,000,000. This increased contamination in cold weather is accounted for by the excessive contamination of the hands with organisms from the nose and mouth; this due to increased coryza, sneezing and coughing. We believe that the increased prevalence of the so-called respiratory diseases during the winter months can be accounted for by the increased mucous secretions during that period.

In a series of experiments we have succeeded in isolating diphtheria bacilli from the hands of diphtheria carriers, and hemolytic streptococci from the hands of streptococcus carriers. In the latter case we were able to isolate large numbers of streptococci on every trial; in addition it may be pointed out that the hands of these carriers are more highly contaminated with common organisms than the hands of average persons.

When a company of men wash their mess equipment in warm soapy water each man contributes about 4,000,000 bacteria. A large percentage of these are, of course, mouth organisms. When warm clear water is used only about one-third or 1,600,000 organisms are contributed by each man.

In the foregoing experiments the hands were not used as a mop to wash off the mess equipment, and it is a remarkable fact that when the hand is so used the wash-water is not so highly contaminated. In a set of experiments in which the hand was used as a mop each man contributed to warm soapy water and clear water 8,000,000 and 260,000 respectively. The only conclusion to be drawn from these findings is that when the hands are used to rub off the mess equipment the particles of food, fat, etc., and the mouth organisms adherent thereto cling to the fingers. So then the man's hands become highly contaminated with his own mouth organisms in addition to those picked up from the wash-water. He transfers the newly acquired organisms to his own mouth and contaminates inanimate object conveyors with his highly contaminated hands to no small degree. It is obvious then that this method of washing mess kits adds greatly to the possibility

of transmission of mouth-borne diseases by indirect contact through intermediate conveyors as well as from one individual to another through the wash-water as a common point of contact.

There is no question but that the average individual's hands are highly contaminated under ordinary circumstances with his own mouth organisms, and if he be a carrier, a convalescent, or a mild unrecognized case of any one of the acute infectious diseases, his hands will certainly be contaminated with the disease virus. Many persons smother their cough with their hand. In addition to the contamination of the hand by coughing, the hand visits the face and particularly the mouth at frequent intervals and the hand so contaminated handles things —door knobs, pencils, toilet articles, telephone receivers—which other persons handle. After the saliva has become dried its distribution is limited, but when the germ laden saliva is moist it is spread with great facility to conveyors, and to the hands of others. The hands of typhoid carriers have been repeatedly incriminated as spreaders of typhoid fever. If the hand of a typhoid carrier is liable to pollution, is it not a foregone conclusion that contamination of the hand in the case of one infected with sputum-borne disease, is increased many fold?

Bacterial Content of Eating Utensil Wash-Water.

The bacterial count of mess kit wash-water varies between 1,000 and 157,000 per cc. This count depends upon the temperature and the amount of the water, and the number of men using it. As a result of our investigation in the Southern Department last winter we found that the average temperature was 47° C. and the bacteria was 40,000 per cc. This count is about the same as average milk, but it is to be pointed out that bacteria in mess kit wash-water would naturally be those in which the human host is the carrier; while in milk this is not usually the case.

Hands and mess equipment of non-immunes, contaminated with disease producing organisms from the mouths of others through highly polluted common wash-water, readily gain access to the mouths of these non-immunes and there deposit organisms which produce a carrier state or specific disease.

If mess kit wash-water common to an organization is responsible for explosive epidemics in the army, it occurred to us that perhaps common dishwater in public eating houses is, to a less extent, responsible for the spread of mouth-borne diseases. In this instance the contamination of the hand is eliminated for it does not come in contact with the wash-water; so the only avenue of spread is through eating utensils, and this accounts for the lower incidence in civil life.

In order to make plain our argument in favor of the transmission of mouth-borne diseases through restaurant and hotel table utensils we report that the examination of 54 specimens of dishwater from 10 different restaurants showed the average bacterial count to be 4,000,000 per cc. We have isolated 12,000,000 organisms from the ladle of a spoon used by a streptococcus carrier. Many of these organisms were streptococci. We know that streptococci survive for some time in water and are resistant to desiccation for at least several days on a dried surface. In general the same holds true for many other diseases producing organisms. So we have no doubt but that disease producing germs may be transmitted through common eating utensils which are washed by the usual method in tepid water. The number of organisms per cc. in restaurant dishwater is far greater than in many specimens of sewage, and one would

not intentionally wash eating utensils in sewage.

A spoon may be contaminated with a culture of known organism, then dried and washed with eating utensils in the usual manner and finally identified by the original contamination which has adhered to it during the washing process. From these facts it may be deduced that in civil life as well as in the army, only to a far greater degree in the latter, eating utensils constitute the most intimate and frequent point of indirect contact for the spread of mouth-borne diseases.

Much has been accomplished in protecting our public water supplies against sewage pollution with the consequent reduction in the incidence of intestinal-borne diseases. Can a similar advance be made in the reduction of the incidence of mouth-borne diseases by protecting the public against the use of saliva polluted eating utensils? An enormous advance has been made by the propaganda against the common towel and drinking cup, but will not a far greater good be accomplished by popularizing the disinfection of eating utensils by boiling water? This applies to the home as well as to the public hostelry.

We have been struck by the rapid spread of influenza in a family. We believe that, as among troops so also in the family, this is not by direct contact but by indirect contact. Members of a family whose daily occupation calls them away from home, eliminating them to a large extent from intimate contact, develop the disease as do those in which there is a constant close association. Is it possible that eating utensils are responsible for this rapid and almost constant spread in a household? The housemaid, as does the restaurant helper, washes the tableware in warm tepid water. The warm dish-water in the home as, also in the restaurant, constitutes not only the vehicle for the spread of contamination from one piece of tableware to another, but at the same time furnishes an optimum temperature, a fluid medium, and an intermediate conveyor for large and small groups of individuals, and the larger the group the greater the possibility of carriers and of infecting non-immunes.

From the foregoing considerations the following principles may be deduced.

1. The causal organisms of sputum-borne diseases, resident in the mouth and nose, leave the body of the infected through these orifices and enter the non-infected through similar channels.

2. The vehicles for the transfer of germ-laden saliva from, and to, the mouth and nose, are the hands, and eating utensils.

3. Crowd diseases have their origin, to a large extent, in the constant accumulative contamination of intermediate objects, which are the distributing centers of the infection for many hands and many mouths.

4. Food may be infected by contaminated hands and then spread the sputum-borne infections, as well as the intestinal-borne infection.

5. In all infectious diseases there are major and minor routes of transmission from the sick to the well. In military life the mess kit wash-water has proved to be the major route; intermediate object conveyors by hand touch, the minor route. Droplet infection is subsidiary to both, because explosive outbreaks do not result from droplet infection and as far as mouth pathogens are concerned, 18 inches is about the maximum distance that plates on a level with the mouth can be infected by droplets expelled through the act of coughing. Moreover, since the weight of these droplets (even the finest spray) is such that they fall rapidly, the probability of infection by the flight of organisms is remote.

6. It is true that the chain of both direct and indirect transmission may be broken in several ways; one of these is by wearing the mask. This acts in two ways—it prevents droplets being expelled from the mouth, and it also prevents the hands being put in the mouth. On this basis the value of the face mask may be emphasized. Its value, however, lies in the fact that it serves as a barrier between the hand and the mouth rather than between the mouth and the outside air. The wearing of the mask by a sick man is not the most effective procedure, for it only affects the sick man from whom infection is relatively infrequent as compared with carriers, unrecognized mild cases, and convalescents. The relative importance of the face mask to clean hands is just about the same as in the case of the surgeon who would wear a mask but neglect to wash his hands. In order for the mask to be effective the wearer must wash his hands before it is removed. Was there a lower rate of infection in cities where the populace wore masks as required by local ordinance? In San Francisco the wearing of masks was required; the rate per 1,000 according to the United States Public Health Reports, was 46 for seven weeks. In New York masks were not worn and the rate was 47 for eleven weeks.

7. Very probably droplet infection, when it does occur, is indirect, rather than direct, that is to say, mouth spray does not immediately reach the mouth of another person, but reaches the hands and intermediate objects from which germ-laden saliva is picked up and carried by the hand to the mouth of the non-infected.

8. In the prevention of sputum-borne epidemics, the hygiene of the hand and the hygiene of eating utensils is of paramount importance; clean hands, disinfected eating utensils, the avoidance of intermediate object conveyors handled by many persons, the frequent cleansing of such conveyors, the keeping the hands away from the mouth and nose, and eliminating the sick from the kitchen, these are the essentials of such prevention.

But above all is the necessity for popularizing our knowledge that it is the sputum-soiled hand, and the contaminated eating utensil which play the chief rôle in mouth-to-mouth infections.

Only through popular instruction and coöperation can such epidemics be prevented and human life conserved.

The authors wish to express their appreciation for the able assistance rendered by Major W. Colby Rucker, U. S. P. H. S., and Captain Charles B. Spruit, M. C., and 1st Lieut. Ernest J. Aten, M. C., in field as well as in laboratory investigations.

Addendum.

In the report submitted by us at Tuesday's meeting it was shown that 80 per cent of the infections among 66,000 troops were due to unsanitary messing arrangements. Applying this fact to civil life it occurred to us that perhaps hand washing of dishes in tepid water at public eating houses is (to a less extent) responsible for the spread of mouth-borne, family or group, diseases.

From the foregoing facts the logical

Hotels and Restaurants	Employees	Employees Having Influenza	Rate Per 1,000	Method Dishwashing
6 first-class restaurants and hotels in business district (cooks and dining room help)	1,350	13	9	machine and boiling water
6 eating places near R. R. depot in poor district (cooks and dining room help)	25	7	240	hand washed
Department Stores				
Employees dining room in 4 department stores in shopping district	13,500	181	13	machine and boiling water
Employees dining room in one department store in shopping district	3,100	259 (11 deaths)	84	hand washed

conclusion is that organisms can be transferred from the mouth of one individual to that of another by means of eating utensils washed in the ordinary way. Since the aforementioned report was presented, a canvass of three types of public eating places in a large city has been made with the tabulated results (page 37), relative to the recent epidemic of influenza.

It will be noted that there are 85 per cent more cases among those who eat from hand washed dishes which are not disinfected by boiling water.

Is not this a suggestion for sanitary dishwashing,—immersion in boiling water, —in the home, as well as in public eating places and does it not give us a new conception of what we mean by crowd disease?

THE ORGANIZATION OF FEDERAL, STATE AND LOCAL HEALTH FORCES.

ALAN J. MCLAUGHLIN,
Assistant Surgeon U. S. P. H. S., General, Washington, D. C.

Read at the Annual Meeting of the American Public Health Association, Chicago, Ill., December 9-12, 1918.

I PROBABLY shall say things that will provoke discussion. I feel that in the question of organization to meet this national crisis federal health forces in this country faced a situation that presented some extraordinary features. In the first place, if we search the history of this country, we will fail to find a parallel in its appalling loss of life, in its morbidity or mortality, in any epidemic of any kind that has visited the United States. An epidemic of yellow fever that cost one thousand lives, spread over the territory that this has been spread over, would throw the whole country into a panic. This country, with a placidity that is admirable, stood quietly by and sustained a loss of over 300,000 lives, and outside of this hall you hear very little about it. I think we are justified in keeping up this discussion if it lasts until midnight. While I feel some of you may feel disappointed because you do not know all about it, that is no reason why we should not keep on discussing until we find some fundamental facts and try to get on a common ground as far as we may.

We have had epidemics, but as a rule they take a state or group of states, leaving the rest of the country from which personnel may be drawn to assist the afflicted portion.

When this epidemic broke out, a great majority of the medical and nursing personnel was already in the army or navy, so that for two reasons the available personnel from which to draw was very limited.

The next difficulty was the lack of accurate knowledge of the cause and mode of transmission of this disease. We might as well admit it, we have an absolute lack of knowledge of the cause and transmission of this disease. The result of that is another lack which is a very serious one to the officer trying to suppress disease—the lack of biologic products with which to suppress it. After we acquire sufficient knowledge about the cause of this disease, we can develop in the laboratories biologic products for prophylactic diagnostic and therapeutic use.

The lack of knowledge of the etiology and transmission of the disease makes our quarantine measures peculiarly futile. Maritime quarantine—usually a very exact procedure with most diseases—does not prevent the spread of this disease.

For instance, this disease was not present in Alaska. A ship was going to Alaska from western ports. It was deemed best to put on quarantine to prevent the entrance of the disease into Alaska. I have this information from Dr. Tuttle, health officer of Washington. A triple examination of the passengers was made separately by three individuals—one an officer of the public health service. The results were such they weeded out those considered as possible carriers of this disease. The ship sailed, and on that long voyage to Nome nothing happened on the ship—no sickness. The passengers landed and distributed themselves, and within the period of incubation, the disease appeared and spread rapidly in Alaska. The carriers were on the ship, but quarantine was futile to weed them out with the present knowledge we have.

The quarantine of the sick is an obvious thing to do, but after all, we must remember by making that sick individual safe, we are quarantining the least active and least dangerous of the carriers of the disease. For the sick individual, there are hundreds of others who cannot come under any quarantine.

The wearing of the mask in a way is a protection to the individual very well worth a trial. But after all, a man may protect himself from this disease or any other disease by crawling into a hole and staying there. But most of us would have to come out of the hole sooner or later.

Many of the measures suggested are not practical. Now the restrictive measures have been criticised by some, although pretty generally employed to restrict gatherings of people, and they were based on sound general principles. In the absence of any definite knowledge such as we have against cholera, or yellow fever, I ask you gentlemen, What other sane procedure was there than to act on general principles, considering this a contagious disease, and to prevent the gatherings of people in close contact, where presumably greater spread of the infection would occur? The restrictive measures had one result in a great many places, if no other may be conceded to it. That was this: It tended to prevent the sudden rise and enabled the communities to furnish sick and nursing relief to those who needed it by distributing the load, making a flatter curve, and giving the authorities time to organize forces for sick relief.

Under these circumstances, the work became largely a question of furnishing sick relief, as far as the Federal government was concerned. It is futile to talk of suppressing the spread of a disease of this character with our present knowledge. But the furnishing of sick relief was a great necessity. Congress promptly appropriated a million dollars for the furnishing of this needed aid. There were sections in the country which were absolutely stripped of doctors, especially in the agricultural states like Nebraska, and North and South Dakota, where the small medical population had been taken into the army. In these states it was necessary to get doctors in from outside, but we tried to avoid robbing Peter to pay Paul. So that in every state there was a representative of the United States Public Health Service to handle the relief which the Federal government was able to give. We had with the state health officer and the public health service officer a representative of the American Red Cross appointed for each state. It was necessary to have this kind of an organization in order to utilize what I spoke of a moment ago as the very limited personnel, to the best advantage, because from a central point like Washington, it was impossible to estimate the relative urgency of calls from two towns a thou-

sand miles away, whereas the man in the state could estimate their urgency.

The need for nurses was never fully supplied, the principal cause being that so many Red Cross nurses were in the army, but they did the best they could under very trying circumstances. Their primary object was to supply nurses for the army, but they have been criticised, just as the army has been criticised for not furnishing doctors to the civilian population. The Red Cross did the best they could, but were not able to furnish sufficient nurses, so the local authorities were compelled to take the nurses available, and with them, to train intelligent women as nursing aides. In many cases the Catholic nursing sisters rendered very great assistance, especially in the mining regions of eastern Kentucky and Pennsylvania, and volunteered in great numbers in the city of Washington. The non-nursing sisters did work of any kind.

The decentralization of the Federal organization goes even further. It is necessary to district the state in order that the state officer in charge may utilize his personnel to the best advantage. The same principle applies to the city health officer. He must district his city so that he can get accurate information. The primary necessity of a public health campaign of this kind is to get accurate knowledge of the prevalence of disease. Doctor Woodward spoke of reporting in the cities. I believe it should be a reportable disease, but in epidemic times it is not necessary to depend on the doctors. If you establish your headquarters, with your telephones properly advertised, calls will come in, and if you have your medical, nursing, and other forces available at headquarters, you will be kept pretty busy. In some places they do not wait for that. It is a very good policy to put in a house-to-house inspection, and make a canvass of the city. In Detroit they used as centers the two hundred schoolhouses, and the schools being closed, they used the teachers for the house-to-house visits, and were able to cover the entire city every three days. That is getting information, and it is independent of the reporting by the doctors, which is a very slender reed to lean on when doctors are so busy they are not getting time to sleep.

This organization of the Public Health Service, while largely limited to the furnishing of the sick and nursing relief, we believe was the best thing under the circumstances. In states where we had no representatives, state health officers were asked to accept appointment so that they could disburse our funds. With the reserve bill which has been passed we are now in better shape to handle just such an emergency as that through which we have just passed. In that organization we will have every state health officer in the country—not on active duty until he is needed. You will realize what this will mean when I tell you how inadequate was our personnel. The bulk of the doctors were in the army. The Volunteer Medical Service Corps gave us lists of names. We took them and sent them to the state health officer, and sometimes the man listed was 85 years old! At other times he had a wooden leg or was an addict or something else we knew nothing about, but we had to use what we could get. The fortunate thing is the great bulk of the men we got were the finest kind of men; so that these other derelicts I have mentioned are simply a small part of our problem, because they were quickly weeded out by the health officer and sent home. The other men came, some of them leaving practices of $20,000 a year—we were giving them $200 a month—and risking their lives. No tribute is too great for me to pay to the spirit of the volunteers, who came and "took a chance" in that epidemic.

THE ULTIMATE BENEFITS TO BE DERIVED FROM THE EPIDEMIC.[1]

LOUIS I. HARRIS, D. P. H., M. D.,
Department of Health, New York City.

OUR discussion of the epidemic of influenza derives a particular and immediate importance from the fact that a recrudescence of the disease in many communities is likely to occur in the near future, and we are all keenly anxious to learn how best to meet the situation should it arise.

What counts even more, however, than the development of a plan of action which will help us to deal effectively with the epidemic should it be rekindled, is the ultimate good which this frightful tragedy may be made to yield. There are those here who will give adequate attention to the purely scientific aspects of the epidemic. It is my desire to call attention to the more general features so that we may learn certain lessons from the events of the past three months. Each of us should go back to our respective communities and urge and plead with all possible emphasis that the 350,000 and more deaths caused by the now waning epidemic in this country shall not pass from memory without leading to a drastic reörganization of public health work in every town, city and state, and in the Federal government as well. Let us make it known that we were not properly prepared to meet the emergency, and let us not permit the significance of the facts revealing our handicaps and short comings to be minimized.

Let it be known that our hospital facilities were not organized to meet the situation, and that the lack of proper governmental control over these agencies caused no end of confusion and suffering. We should frankly point out that the lack of control over doctors brought sharply into focus the commercial aspects of a profession whose protective and healing mission are so sacred and so vital to the lives of people that we must now allow its members to degenerate into independent and competing agents under a competitive system of medical practice. It should be made clearly known that the Federal Health Agencies lacked adequate powers and organization to assume leadership in guiding and coördinating health activities throughout the country, and that, instead, their work resolved itself largely into feverish and oftentimes futile efforts to summon detachments of doctors in the manner of the minute men of Lexington, to battle with the disease as well as they might in stricken and undefended communities.

Shall we permit the spectacle to be forgotten of doctors and visiting nurses who crossed each others tracks, several visiting the same districts and even the same buildings, while in such houses men, women and children were dying for want of medical care, because under the present system of medical practice, the doctors were responding to calls from homes where a financial return could be expected? Shall we blame the doctor for this condition of affairs, or rather the lack of governmental control which would assure medical care to every person in the community, and give a decent recompense to doctors and nurses so as to free them from the necessity of commercial and degrading competition and enable them to devote themselves to ministering to the sick and to the protection of the well?

[1] A Discussion, at the Chicago Meeting, of Dr. McLaughlin's paper, printed upon motion adopted by the American Public Health Association at its general session December 11, 1918.

The socialization of the medical and nursing professions to place them under governmental control and direction should not be longer deferred. We should not be halted in our efforts to secure such a change by those who would seek to dam every such attempt by branding it as socialism.

The salvage of human life ought to be placed above barter and exchange. Shall we not in our reörganization provide so as to be prepared to meet a recrudescence of the epidemic or the development of a new emergency? Shall we, as a nation who have unstintingly given billions for the conduct of war, plead economy and withhold the much smaller sums needed to make possible the protection of human life on a decent scale?

We should take the lessons of the epidemic to heart and go back to our respective communities and demand the apportionment of money for every justified expenditure for the organization of preventive measures, medical care and relief. We should demand that the morale of every local and state organization be raised to the highest standard possible and be safe from political, personal or other petty disturbance, so that public health service shall offer a secure career to those who make it a life work and invite the best medical men and women from a scientific, social and humanitarian point of view, to dedicate themselves to it. We should reörganize health work so that the health officer shall no longer deem it necessary when he meets his professional brethren to say, apologetically, "I am a health officer," but it shall become an honored as well as an honorable career.

Public health protection is not the work of a day, and only by appropriations for an adequate personnel and equipment, and by guaranteeing security of position and of the morale of health organizations, will communities be better prepared to cope with disease and to extend the province of preventive medicine. These observations apply to the present situation.

The Federal Health Department, instead of dissipating its energies in attempts to provide medical and nursing attendants in cases of emergency—a task that it cannot hope to fulfill adequately—should be the leader and guide in public health work. It should serve as the clearing house whose agents, scattered about in this country and abroad to the far corners of the earth, should serve notice without delay of dangers that threaten from various sources, so that we may not be taken by surprise. It should serve as a pace-maker, not attempting the hopeless effort to be the nation-wide medical servant and sanitary police corps, but rather as a center from which authoritative judgments and guidance shall issue to every health agency, large or small, to stimulate them to greater effort. The Federal Health Department should be the coördinating body, a pace-maker and a model for all other health departments. It should be the unifying agent that brings about team work between departments and laboratories throughout the country, and the advocate and friend of every weak and struggling health organization. Finally, every nurse and doctor now in military service should be released as soon as possible for community service in case of necessity.

I am purposely avoiding the citation of experiences of purely local interest. I an hopeful that every person here present will become a missionary to carry back a message that will make for radical reörganization so that we will be better equipped to deal with routine and emergency conditions.

In any scheme of reörganization the American Public Health Association ought to play an important part. This

body should likewise be a clearing house for authoritative opinions on matters of immediate importance; and all information gathered from the papers that have been presented here and from the discussions that have taken place, should be disseminated promptly, and not filter through after the lapse of months. This Association should set standards in public health work for the guidance of all of us, and should make its influence felt in aiding the work of every local, state and other governmental health agency which may need a champion, and it should be unrelenting in opposing everything that tends to weaken health organizations. Let this night mark the beginning of a persistent and unremitting propaganda carried on by this Association to bring home to every community the need of increasing its appropriations and its personnel, to the end that human life may be better protected. In this way only may some measure of good be derived from the tragedy out of which we are apparently just emerging.

WHAT WE REALLY KNOW ABOUT THE EPIDEMIC.

MATTHIAS NICOLL, JR., M. D.
Deputy Commissioner of Health of New York State.

Read before the American Public Health Association, Chicago, Ill., December 10, 1918.

DR. NICOLL expressed regrets in behalf of Commissioner Hermann M. Biggs that he was not able to be present, and made the following statement:

It has seemed to me desirable after having listened to the discussion on epidemic influenza for the past two days, rather than to adhere to the specific subject assigned to Commissioner Biggs,* to sum up briefly what is definitely known regarding so-called influenza at the present moment, in the hope that the confusion which must exist in the minds of many health officials here present may be somewhat allayed and that even though they take home with them a sense of disappointment on account of lack of positive knowledge, they may, nevertheless be not committed to speculative theories and half truths. What then is definitely known about so-called influenza at the present time?

1. That an epidemic of an unknown disease recently invaded this country and that it still prevails in local epidemics and sporadic form.

2. That the general mortality caused by this unknown disease has never been equaled in the country as a whole.

3. That this unknown disease kills by secondary pneumonia, usually of a peculiar broncho-pneumonic type and due to a variety of organisms, including probably the so-called influenza bacillus.

4. That the uncomplicated disease causes a marked leucopænia, together with a profound toxæmia, with a tendency toward the production of hemorrhage.

5. That the age of special susceptibility to this unknown disease is that of young adult life.

6. That among pregnant women it is especially fatal.

7. That those who go to bed and remain there, even with ordinary nursing care, until at least a week after the establishment of full convalescence, will in the large majority of cases recover.

8. That strict quarantine of groups of people has frequently been successful in keeping out the disease.

* Dr. Biggs was to have spoken on "The Value of Prophylactic Measures."

All other fundamental statements and observations regarding this disease are, to the best of my knowledge, conjectural, and not a single observation other than those stated, however eminent the observer, but has been negatived by the results obtained by equally eminent observers.

In view of these facts I feel that it would be a waste of time to discuss the value of prophylactic measures. In New York State we have made the disease reportable, rather regretting the necessity for so doing, viz., administrative purposes, for naturally a disease for which at present there is no method of diagnosis other than clinical observation of greatly varying skill, cannot be reported accurately, and this fact, especially in non-epidemic years, is bound to render morbidity statistics of the infectious diseases of less value.

Schools, churches and movies have been closed with more or less regularity throughout the state, depending on the judgment of the local health officer. With what result it is not possible to determine at the present time. Unguarded sneezing, coughing and spitting have been declared misdemeanors, since it was believed that all the evidence went to show that coughing and sneezing especially were the most frequent method of dissemination, and I am going to be presumptuous enough to disagree with Colonel Vaughan that hand-to-mouth infection can be an important and frequent method of transmission of a disease, whatever its nature, which spreads with such marvelous rapidity as so-called influenza.

Vaccines, mainly those composed of a dozen strains of Pfeiffer bacilli, have been rather extensively used throughout the state, and investigations regarding their value are now being made, especially in state institutions, by members of the Influenza Commission appointed by Governor Whitman.

Finally, the use of masks has been fairly common, with what results it is not possible at the present time to state.

It seems to me that it behooves all of us in public health work to keep our heads, acknowledge our ignorance, preserve our patience, and pray that some one of the great army of research workers throughout the world, happily removed from the tumult and shouting of unsubstantiated observations, will before long be able to enlighten us as to the cause of this disease, and later devise specific methods for its control, for in no other way does it appear that the health officials of the state and nation can be rescued from their present condition of utter helplessness in the face of future epidemics.

STUDIES ON THE ETIOLOGY OF THE PANDEMIC OF 1918.

W. H. Park, M. D., and A. W. Williams, M. D.

In association with H. M. Hatfield, M. D., E. Valentine, A. G. Mann and H. D. Hussey of the Bureau of Laboratories, Department of Health, New York City.

Read before the American Public Health Association, Chicago, December 9–12, 1918.

UNTIL just after the great pandemic of 1889–92 no single species of microörganisms had been found with enough frequency in cases of influenza to be considered as the specific cause of the disease. Then Pfeiffer found a minute organism in a small series of cases occurring about one year after the peak of the pandemic.

Pfeiffer's reasons for claiming that his bacillus, which has since been named B. influenzæ, is the cause of epidemic influenza are as follows: (1) He found it in large numbers in every case he examined, sometimes in pure cultures. (2) He found no other organisms in every case. (3) He found it at the site of the lesion, that is, in the bronchial secretions in the living, and, as well, in the deeper portions of the lungs after death. (4) He said it disappeared from the secretions after the patients became entirely well. (5) He did not find it in other conditions. (6) He said he produced the disease irregularly in monkeys and atypically in rabbits and he recovered his organism from the site of the lesion. He thus apparently fulfilled the postulates of Koch which were supposed at that time to embody the proof of the specific pathogenicity of an organism.

We know now, however, that these "postulates" are not necessarily the only ones to prove that a given organism is specifically pathogenic, neither are all of them always essential for proof. We know that the demonstration of specific antibodies in the host constitutes the strongest proof of specificity and the test must be made in those cases where similar organisms are found in other conditions. And we know that the invading organism, contrary to Pfeiffer's first statement that true influenza bacilli are only found in true clinical influenza, influenza-like bacilli that cannot yet be differentiated from the B. influenza by any known tests are found in many other cases than those of epidemic grip. And since the animal experiments are not yet clear and no group antibodies have yet been demonstrated,* and since other observers have not found influenza bacilli in all cases diagnosed as epidemic grip, doubts have accumulated in regard to their specific action.

Furthermore, after the announcement was made a short time ago that some "common colds" were probably due to a filtrable virus, it was suggested that influenza also might be due to a filtrable virus and that the influenza bacillus and the other organisms described as the cause might be only secondary invaders.

With the coming of the 1918 pandemic we knew that if the influenza bacillus was the initiating cause, we must be dealing with a single type of exalted virulence or toxicity or both, and that unless we could recover influenza bacilli from the large majority of early cases and show a definite antibody relationship between these strains, we could not add evidence as to its being the exciting factor.

The first published reports of the bacteriological findings in the present epidemic have not helped to clear up the doubts as to the part played by the influenza bacillus in these cases. A number of investigators have not found any of these bacilli.

It is surprising, however, how little de-

* Wollstein, *Jour. Exp. Med.*, 1915, XXII, 445.

tail these reports contain concerning the methods of isolation of the influenza bacillus. Those of us who have through experience learned of the ease with which the influenza bacillus may be missed in an examination, know how little dependence can be placed upon reports of negative findings unless those reports describe fully the media used, the source and dilutions of suspected material, the time allowed for the cultures to grow and the use of specific tests and stains, and also show that all of these factors have been handled in a satisfactory way. We have not yet seen one report of negative findings as far as the influenza bacillus is concerned that gives all of these particulars. Neither have most of the investigators described the organisms they did find with enough minuteness to allow of their identification by others. Bearing in mind, however, the characteristics of each group of organisms to which the organism belonged that had been described as the prevalant organism in a series of cases in different parts of the world, we chose in our own work our culture media and methods of obtaining material, as far as we could judge from the meager reports, so we might be able to detect any or all of the microorganisms described or any others of significance, with the exception of a filtrable virus.

We came to the conclusion that a study of the existence of a filtrable virus to be worth anything involved such controlled handling of human tests, that it could be done best in camps with volunteers,—therefore we decided to leave it to the camp workers. So far the few experiments made in this country for detecting a filtrable virus have been negative,* while in France two insufficiently controlled experiments have been reported.†

We began our study of this epidemic about the middle of September. The contagious disease hospitals of New York City received groups of sailors from the Navy Yard in this vicinity so we had the opportunity of studying a number coming down with the disease. At about the same time we also obtained material directly from the receiving ship in order to get some cases in the earliest hours of infection. We made a study, as well, of some early and later cases from a camp in this vicinity.

We at first made a study of cultures from different parts of the naso pharynx (nose, tonsils, entrance of posterior nares into pharynx)— from the deeper air passages and from the sputum (secretions cannot be obtained early in the disease). We soon found that we obtained cultures with less contaminations by the ordinary mouth organisms when we took them from the pharynx at the entrance of the posterior nares by means of a turned swab protected by a West Tube, in the same way that cultures are obtained for the determination of the presence of meningococcus.

We, therefore, took all of our later cultures in early cases only from this area, and called them naso-pharyngeal cultures. Our second best results were from the tonsils. Cultures from the sputum in these early cases were very unsatisfactory since many mouth organisms were present and the influenza bacilli were apt to be missed.

We chose media for growing these cultures which we had found best for the development of influenza bacilli, of hemolytic streptococci, of pneumococci and the "streptococcus viridans" group and of meningococcus-like organisms, and arranged our record cards so we could note the presence and number of these organisms and of any other microörganism that might be either in great abundance or have peculiar characteristics. We also examined cultures under partial anæro-

* J. J. Keegan, *Jour. A. M. A.*, 1918, LXII, 1050.

† Nicolle and Le Bailly, Compt. rend. acad. cl. sc., 1918, CLXVII, 607; Dugarrie de la Rivière, *ibid.* p. 606.

bosis in our hunt for unusual microörganisms, so far with negative results. Our method of making this study may be described as follows:

At Bedside.

1. Cultures are taken from naso-pharynx with swab protected by West Tube.
2. A small area is inoculated on one side of blood-pour vitamin-agar plate.
3. Then on blood-drop-agar plate (a drop of blood placed on one side of veal-agar plate), a similar small area is inoculated with the same swab.
4. Then the swab is rubbed around in a tube containing blood broth (4 per cent whole blood) and afterwards removed, and discarded.

Citrated horse blood was used for all of this work.

At Laboratory.

The two plates and the blood broth tube are carried to laboratory, where, (1) with a sterile platinum loop, another blood drop plate, using vitamin-agar, is inoculated from the inoculated area of the first, streaking out over the entire plate many streaks from the inoculated area; (2) the other two plates are then streaked in same manner; (3) two blood-pour-agar plates are made inoculating while the blood-agar is still melted (at 45° C.) with 1 loop and 0.2 cc. respectively from the blood-broth tube inoculated from swab.

In 24 or 48 hours, the influenza colonies appear (1) on blood-pour-agar-plates to the naked eye as minute dew-drop colonies, and (2) on blood-drop agar plates under the microscope (mag. 100 diam.), as small whitish areas embedded in the red-blood cells. The pneumococcus and streptococcus show a greenish rim; the blood cells are not so used up. The influenza colonies are most typical on this plate. They often show a characteristic "heaping" in the center. When surrounded by blood cells, the margins of the colonies often appear irregularly scolloped, but on the edges of the blood mass the free margins of the colonies are usually entire, with an occasional indentation. It is difficult, however, to focus on a definite marginal line, the margin seems to vanish suddenly on focusing. The third dilution plate—the blood-drop-vitamin-agar plate—often shows very large colonies of influenza bacilli. Transplants are made on glycerin-veal-blood-agar (Chocolate medium). The formula for which is the following:

Chocolate Medium.

Veal agar—neutral to phenol phthalein.
Glycerin—5 per cent.
Whole blood (horse or other)—5 per cent.
Add blood to glycerin-veal-agar just after latter has been removed from sterilizer (at about 90° C.).

The formula for vitamin-agar is as follows:

VITAMIN AGAR.

Beef heart—fresh, trimmed free from fat and tendon, and finely chopped.
Peptone—Difco—1.5 per cent.
Sodium chloride—0.5 per cent.
Eggs and tap water.

PROCEDURE A.

Beef heart—500 gms.
Tap water—500 cc.
Egg well beaten—1
Peptone—15 gms.
Sodium Chloride—5 gms.
Heat in water-bath, double boiler or over open fire with constant stirring until color changes to brown (at about 68° to 70 ° C.). *Do not use cheesecloth.*

PROCEDURE B.

Agar—15 gms.
Tap water—500 cc.
Heat to dissolve agar, either in autoclave, or over open flame. If latter, make water lost by evaporation. Do this by weight. When agar is completely dissolved cool to 70° C. and add mixture. Set reaction (or make slightly alkaline to litmus paper) 0.4 acid to phenolphthalein (room temperature titration) by adding normal sodium hydroxid. Place mixture in autoclave and heat for one-half hour at 15 pounds pressure.
Remove kettle carefully without disturbing contents and set aside to solidify. The meat particles, etc., settle gradually to the bottom. After the agar hardens completely turn it out in mould form and trim off the layer containing the sediment. The remainder of the agar is fairly clear.

Melt and tube or bottle.
Sterilize for one-half hour at 15 pounds pressure.
Colonies of B. influenzæ appear usually in twenty-four hours. Negative plates should be returned to the incubator and examined again after forty-eight and seventy-two hours before being discarded as negative.

We examined about two hundred cases diagnosed clinically as influenza in from the first to the sixth day of the disease. In all of these cases we found that the earlier the case was cultured the more constantly did we find large numbers of influenza bacilli in the naso-pharynx. No other picture was so constant, though we did find a high percentage of meningococcus-like organisms, and of streptococci belonging to the viridans group.

We have had two groups of cases since which strikingly bore out this picture.

The first group was in a children's home where some nurses, who had been sent out to help the sufferers from a munition plant blown up, among whom many cases of influenza developed, came down with the disease just after they returned to the home, and an epidemic swept over the institution in quite virulent form. We were able to culture many of the cases in the first day of the disease. These all showed abundant, almost pure cultures of influenza bacilli, and 98 per cent of the others (forty-eight cultures in all) showed the bacilli in large numbers. Among nine cultures taken in the Admitting Ward which was not kept strictly quarantined, four demonstrated influenza bacilli. One from a case having a nasal discharge, contained many, and the others very few. Any deductions drawn from the high incidence of the influenza bacilli in the typical cases of this group are vitiated by the fact that there had been a number of cases of pertussis in the institution during the summer.

The other groups consisted of eighty Marines who came from the South in a body, and who just as they arrived in New York all came down with the typical "influenza." They were sent to the hospital immediately. We cultured thirty of them and all showed large numbers of influenza bacilli, almost pure cultures in many of the cases.

In this group there had been no pertussis and no measles, in both of which diseases influenza bacilli are usually found.

Our most striking control so far is from a girls' home containing 500 inmates where no influenza cases had occurred. Thirty-four cultures were taken from different groups of girls, and in only two, one of which had a "slight cold" and had been kept isolated, were influenza bacilli found.

Since this examination was made we have examined a preventorium where the inmates had not been kept strictly isolated from the village in which there had been a number of cases of influenza and where there had been one typical case of influenza and the usual number of short fevers, and where we found that 33 per cent of the cultures contained influenza bacilli.

We were able to make a bacteriologic examination of thirty autopsies, the results from which are given briefly below.

In twenty-four cases we found influenza bacilli in the lungs, in five of which they were in pure culture. In twenty-six out of twenty-seven tracheas in these cases we found influenza bacilli in large numbers. We found pneumococci (mostly type IV) in fifteen lungs; streptococcus hemolyticus in nine, gram negative coccus in one, staphylococcus in two and small gram negative bacillus in one. We thus see that the influenza bacillus was found more frequently than any other one organism. But our serologic studies so far seem to show that it was a frequent secondary invader rather than the initiating cause.

All our results in regard to the incidence of the influenza bacillus may be tabulated as follows:

B. INFLUENZA.

Group.	*Present.*	*Absent.*	*Per cent.*
Hospital Cases	160	40	80
Marines	30	0	100
Home for Children	47	1	98

CONTROLS.

	Present.	*Absent.*	*Per cent.*
Nurses—Contracts	4	6	40
Nurses—Non-contracts	1	7	9
Measles	4	2	67
Admission Ward	4	5	41
Home for Girls	2	32	6
Preventorium	14	25	33

AUTOPSIES.

Material.	*Present.*	*Absent.*	*Per cent.*
Lungs	24	6	80
Pure Culture	5	25	17
Tracheas	26	1	96
Heart's Blood	3	27	10

Just as soon as we began to find the influenza bacilli in such large numbers in the early cases and in pure cultures in the lungs, and in very large numbers in and between the cells in direct smears from most of the tracheas examined at autopsy, we came to the conclusion that whether or not this bacillus is the initiating cause of the present epidemic, it gave evidence that it had a marked pathogenic action. This seemed to be sufficient reason for us to make as thorough a trial as possible of the effect of an influenza bacillus vaccine on the prevention if not of the pandemic at least of a number of the cases of infection with this bacillus.

The problem of producing immense quantities of vaccine; of determining the best dosage; the time for immunity, if any, to be established; of getting the proper controls in communities not yet infected; and above all of keeping good records and gathering and analyzing them is one of the most important and staggering of problems.

We began the use of our influenza vaccine after the pandemic had already started and some groups were not vaccinated until after the peak of the pandemic had passed, so unless we have been able to get sufficient control cases, that is presumably susceptible unvaccinated cases exposed to the same degree and observed at the same time as the vaccinated cases, we could arrive at no conclusion with regard to the efficiency of the vaccine. The reports from the use of our vaccine are being analyzed now and it is already apparent that the majority of them are lacking in many essentials.

The intelligently controlled use of the vaccine might have given us strong evidence in regard to the etiologic relationship of the influenza bacillus to the present pandemic; as it is, unless the finished reports prove to be better than they now promise, we must wait for such evidence as may be gathered from a serologic study of the various strains of the influenza bacillus isolated by us from the typical cases and from control cases.

So far in our serologic work we have studied the agglutination reactions of nine autopsy strains. We began with autopsy strains because we thought they might more nearly represent the pandemic strain if such a strain existed. We found contrary to these expectations, that each strain produced abundant agglutinations only for itself, the absorption test showing absolutely no cross agglutination. It is apparent then that these autopsy strains are the individual's own influenza bacilli. This raises the question of the possibility of missing an initiating strain in the majority of autopsy cases. A study of our two hundred strains from beginning cases, especially from groups of cases where there was every opportunity for mixed infections, may help throw some light on this question.

THE INFLUENZA EPIDEMIC AS SHOWN IN THE WEEKLY HEALTH INDEX.

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Read before the Section on Vital Statistics, American Public Health Association, December 9, 1918, Chicago, Ill.

THE spread of the influenza epidemic across the United States can be readily followed in the *Weekly Health Index*. Only mortality figures are given, but the epidemic is known to have caused so many fatalities within a few days of the appearance of the disease that it is safe to say that the morbidity wave preceded the mortality wave by only a few days at the most.

For the week ending September 14, Boston reported 19 deaths from influenza and 27 deaths from pneumonia (all forms), and within the next four weeks the epi-

INFLUENZA EPIDEMIC, 1918.

City	Deaths per 100,000 population from influenza and pneumonia (all forms) during week ending:											
	September			October				November				
	14	21	28	5	12	19	26	2	9	16	23	30
Total	1.4	3.1	8.0	21.6	51.2	90.5	92.7	66.7	38.0	22.1	15.1	
Albany	1.8	0	1.8	1.8	40.0	97.7	165.2	137.7	46.2	*17.8	3.6	12.4
Atlanta	3.5	——	2.0	3.5	14.9	40.2	*50.1	19.3	15.4	13.4	11.9	
Baltimore	1.2	0.8	3.2	19.5	93.9	226.3	178.9	66.2	24.5	8.5	6.0	6.7
Birmingham	1.0	1.0	2.5	8.1	30.9	55.6	67.3	*43.0	23.3	23.3	22.3	36.4
Boston	5.9	33.7	98.7	154.6	130.8	75.0	28.8	17.4	* 9.7	6.0	6.9	6.9
Buffalo	1.7	2.5	3.4	10.1	38.0	112.2	153.2	96.1	35.5	*16.9	7.2	7.6
Cambridge	6.3	3.6	94.2	125.6	103.2	56.5	18.8	*17.1	4.5	8.1	8.1	6.3
Chicago	0.6	0.9	3.5	16.1	40.3	81.1	91.2	56.6	28.4	15.0	9.7	8.4
Cincinnati	1.2	1.0	1.4	4.3	16.0	45.9	67.2	59.3	39.0	23.2	25.1	22.5
Cleveland	0.6	1.0	1.2	2.2	4.9	19.5	55.9	84.2	64.7	43.3	29.6	24.3
Columbus	0.4	1.8	2.7	4.4	12.4	32.4	51.9	41.7	22.2	16.0	19.1	28.4
Dayton	1.5	0.8	1.5	3.8	23.7	102.6	104.9	88.0	*51.3	16.1	3.8	9.9
Fall River	0	7.0	15.6	75.5	156.6	149.5	75.5	31.2	18.7	10.9	7.8	3.9
Grand Rapids	1.5	——	0.7	2.2	5.2	8.1	16.2	13.3	9.6	21.4	16.2	
Indianapolis	1.0	2.1	3.5	8.3	15.9	44.2	39.7	29.0	20.0	16.6	21.4	
Jersey City	0.6	1.9	6.6	20.7	72.5		133.3					
Kansas City, Mo.	1.6	——	3.2	11.8	30.6	53.5	61.5	62.8	44.0	25.5	20.4	30.9
Los Angeles	1.6	0.9	0.4	2.5	12.1	23.0	51.5	67.2	54.4	52.8	34.5	29.4
Louisville	1.2	3.7	1.6	5.8	37.9	74.2	74.6	28.4	*23.9	16.1	14.4	21.0
Lowell	0.9	7.3	29.3	85.3	129.3	106.3	77.0	*27.5	7.3	7.3	10.0	1.8
Memphis	——	——	——	——	51.7	117.6	107.3	45.9	*	11.0	11.6	3.9
Milwaukee	0.9	1.1	2.9	3.3	15.2	24.9	38.6	27.6	20.9	15.4	10.8	19.4
Minneapolis	0.5	——	2.9	3.4	12.5	25.8	39.1	31.3	24.8	24.3	10.4	10.7
Nashville	1.7	——	2.5	4.2	108.2	161.9	106.5	45.3	44.5	12.6	13.4	19.3
Newark	——	1.4	1.9	12.4	44.1	92.4	100.5	87.7	41.3	25.9	16.3	13.1
New Haven	0	1.3	9.7	23.2	49.7	98.1	118.2	108.5	52.9	31.0	12.9	15.5
New Orleans	1.3	——	0.8	7.6	37.7	163.2	178.4	87.1	41.3	19.9	9.7	11.2
New York	1.4	2.0	3.7	14.1	40.7	81.0	100.1	84.4	43.7	20.2	12.6	8.1
Oakland	1.9	0	0.9	1.4	8.4	19.6	64.4	110.6	73.3	32.7	14.5	4.7
Omaha	0.6	——	1.1	3.9	37.7	88.8	81.5	52.1		26.6	21.1	
Philadelphia	1.1	1.8	4.3	40.1	149.6	261.0	171.5	68.3	21.3	* 9.3	5.8	5.3
Pittsburgh	2.0	2.9	5.7	11.6	19.2	65.6	97.1	106.2	134.5	89.7	64.9	23.4
Providence	1.5	3.8	8.3	37.6	70.6	96.7	82.7	51.2	24.7	*13.7	12.5	8.7
Richmond	2.5	1.9	2.5	25.5	81.5	122.6	79.6	44.2	17.4	14.3	8.1	14.9
Rochester	0.4	0.4	2.6	2.3	13.6	38.5	80.4	78.9	39.3	19.6	15.1	14.0
St. Louis	1.5	1.7	2.6	3.2	11.0	23.8	29.9	33.0	29.4	29.2	24.4	30.1
St. Paul	1.2	——	1.2	0.4	23.7	29.1	22.1	39.6	42.3	52.4	34.1	24.1
San Francisco	1.3	2.9	3.1	3.1	4.0	27.2	115.4	154.2	86.5	41.4	18.8	11.7
Syracuse	0	——	23.5	86.1	135.7	156.7	86.7	42.1	17.3	*14.2	4.3	
Toledo	0.8	0	1.9	1.1	3.4	18.7	52.6	43.9	32.8	17.5	16.0	10.7
Washington, D. C.	3.5	3.2	8.5	43.1	121.5	154.8	96.8	45.1	*13.7	10.5	9.2	10.5
Worcester	4.0	9.8	58.2	114.6	132.5	92.1	51.3	34.0	*	7.5	16.7	6.9

NOTE.—Blank spaces indicate that no report has been received. Black faced figures and spaces underscored in black, ——, preceded the epidemic. * indicates the end of the big mortality wave.

demic had certainly reached 43 of the 46 cities shown in the *Index*, and the other three were already reporting abnormal numbers of deaths from pneumonia. Thus, in a period of five weeks, the mortality wave swept from the Atlantic to the Pacific. The spread of the epidemic westward is shown on the outline map (page 61), where Boston is marked 1, the cities affected the second week 2 and so on. The only city outside of New England in the second week was New York; in the third week the epidemic had reached Minneapolis in the North and Birmingham in the South, and in the fourth week Los Angeles, while cities in the states of Oregon and Washington escaped till the fifth week.

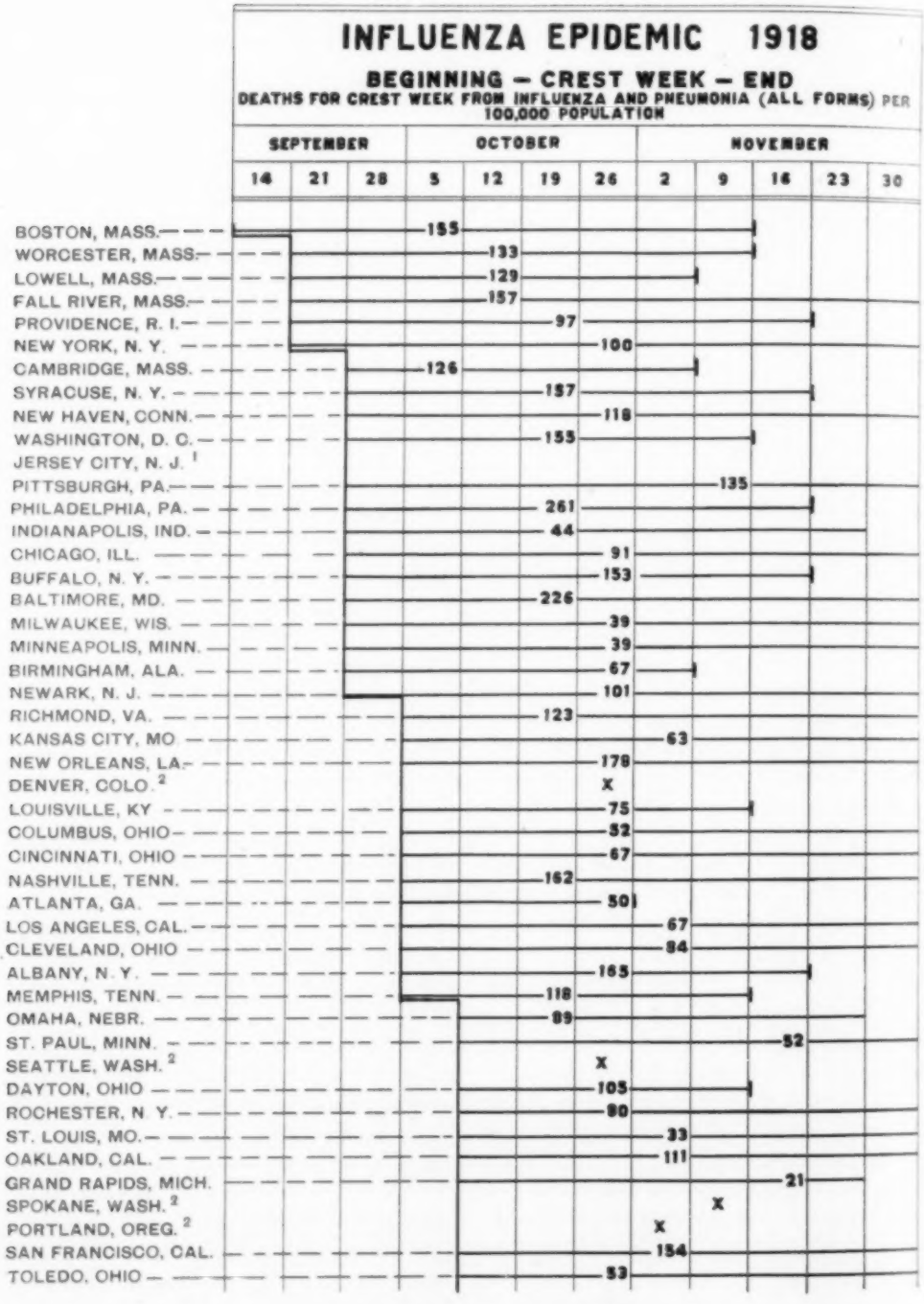
In the chart (page 52), the irregular line on the left marks the beginning of the epidemic in each locality. The cities are arranged as nearly as possible in the order they were affected as indicated by the mortality data, the cities in each group being arranged according to the magnitude of the mortality rates from influenza and pneumonia (all forms) for the first week of the epidemic. The figures in the center of the chart show for each city the crest week and the number of deaths reported that week from influenza and pneumonia (all forms) per 100,000 population.

Similar figures for each week for each city are given in the table (page 50).

For 20 cities the crest of the epidemic came the fourth week; for 12 cities the fifth week; for 7 cities the third week, while the crest of the other 7 cities came in the second, sixth, and seventh weeks. The height of the crests ranged all the way from 21 per 100,000 population in Grand Rapids to 261 per 100,000 in Philadelphia.

The end of the big mortality wave in 15 cities is marked by asterisks placed in the right half of the table. For each city the week beyond this mark is the first week to show a mortality rate from all causes below any weekly rate in the corresponding month of 1917. Since reaching the normal level the rates in a few places have again started upward, but not so rapidly as to suggest the probability of another big mortality wave.

To measure roughly the total mortality of the epidemic to date in each place, the normal number of deaths to be expected from all causes has been estimated for the 12 weeks ending November 30 from the mortality figures of September, October, and November, 1917, and this number subtracted from the actual number of deaths reported for the 12 weeks ending November 30, 1918. The number of normal deaths to be expected during the 12 weeks has been estimated by assuming as normal a 1917 death-rate based upon 12/13 of the deaths which occurred in September, October, and November, 1917, and a 1917 population estimated arithmetically from the last state or Federal census and the 1918 estimate. Broadly speaking the number of excess deaths thus found corresponds closely to the number of deaths assigned to influenza and pneumonia (all forms) so that the total number of deaths from these two causes may also be considered as a fairly accurate measure of the mortality due to the epidemic. The total number of deaths from these two causes in the twelve-week period, with no allowance made for a few missing reports, is 94,267. Moreover it must be remembered that this large mortality is for only about one-fifth of the population of the United States. The number of deaths from influenza and pneumonia (all forms) in the twelve-week period, per 1,000 population for each city, is given in the *Index* for November 30, Philadelphia showing the highest mortality (7.4 per 1,000), and Grand Rapids the lowest mortality (0.9

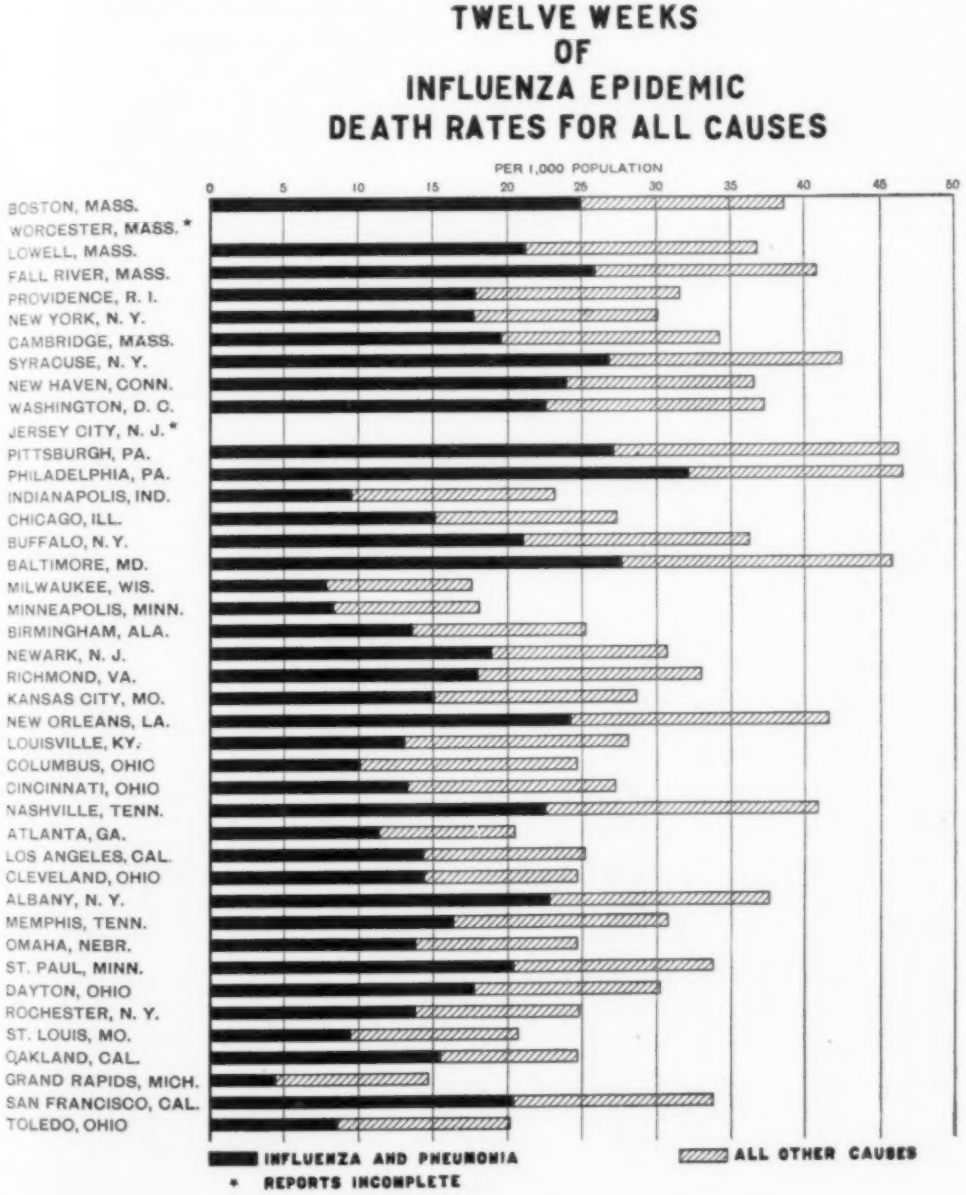


1 REPORTS INCOMPLETE

2 CREST WEEK INDICATED BY X

per 1,000). Other cities with relatively high mortalities were Baltimore, Pittsburgh, Boston, Syracuse, and New Orleans, while relatively low mortalities appear for Minneapolis, Milwaukee, Indianapolis, and Toledo.

Possibly a more accurate measure of the toll of the epidemic would be obtained by subtracting from the totals the number of deaths which were assigned to these causes in September, October, and November, 1917. If health officers or others desire to measure the epidemic in this way, these 1917 figures will be found in the issue of November 16, 1918. Such a refinement of the figures will lead to a



reduction of the totals of about 8 per cent, but is of somewhat doubtful value as only a 4 per cent reduction is needed to make these totals agree with the excess deaths.

Although these methods of measuring the epidemic may be sufficiently accurate, some mention should be made of the possible errors involved.

In determining the number of excess deaths the assumption has been made that the mortality of 1917 in each city for September, October, and November, was a normal mortality. In so far as this assumption is incorrect the calculated number of excess deaths will also be incorrect. Similarly the estimates of population if very much too large will make the number of excess deaths too small and *vice versa*.

Then again, any epidemic of another kind or any catastrophe like the recent subway accident in New York City will swell the number of excess deaths and so make this number a less accurate measure of the epidemic.

So also in the other method of measuring there are several possible errors. The number of deaths from influenza and

INFLUENZA

City	Estimated Population July 1, 1918	Annual Death Rate per									
		September 14		September 21		September 28		October 5		October 12	
		All Causes	Influenza and Pneumonia (All forms)	All Causes	Influenza and Pneumonia (All forms)	All Causes	Influenza and pneumonia (All Forms)	All Causes	Influenza and Pneumonia (All Forms)	All Causes	Influenza and Pneumonia (All Forms)
Albany	112,565	9.3	0.9	15.3		13.4	0.9	*19.0	0.9	35.7	20.8
Atlanta	201,732	12.4	1.8	15.8		10.3	1.0	*20.9	1.8	21.2	7.8
Baltimore	599,653	16.5	0.6	14.2	0.4	*16.9	1.7	27.9	10.2	69.0	49.0
Birmingham	197,670	14.8	0.5	11.1	0.5	*10.8	1.3	22.7	4.2	21.4	16.1
Boston	785,245	*14.5	3.1	32.6	17.6	65.9	51.5	98.0	80.6	85.3	68.2
Buffalo	473,229	14.9	0.9	14.9	1.3	*16.0	1.8	22.4	5.3	37.8	19.8
Cambridge	111,432	19.7	3.3	19.2	1.9	*65.5	49.1	85.2	65.5	67.9	53.8
Chicago	2,596,681	10.8	0.3	11.5	0.5	*12.5	1.8	20.4	8.4	33.1	21.0
Cincinnati	418,022	14.7	0.6	13.5	0.5	13.0	0.7	*17.5	2.2	24.2	8.4
Cleveland	810,306	10.2	0.3	9.5	0.5	10.0	0.6	*10.1	1.2	12.1	2.6
Columbus	225,296	16.2	0.2	12.3	0.9	14.3	1.4	*16.0	2.3	23.1	6.5
Dayton	130,655	12.8	0.8	14.0	0.4	13.2	0.8	16.0	2.0	*23.9	12.4
Denver											
Fall River	128,392	15.4		*20.3	3.7	24.4	8.1	60.1	39.4	101.5	81.6
Grand Rapids	135,450	11.2	0.8	10.0		14.6	0.4	9.2	1.2	*11.5	2.7
Indianapolis	289,577	11.9	0.5	15.5	1.1	*9.9	1.8	19.3	4.3	22.5	8.3
Jersey City	318,770	12.9	0.3	10.8	1.0	*16.0	3.4	22.1	10.8	51.9	37.8
Kansas City, Mo.	313,785	11.0	0.8			12.6	1.7	*18.3	6.1	27.6	16.0
Los Angeles	568,495	12.1	0.8	10.2	0.5	10.2	0.2	*10.7	1.3	14.0	6.3
Louisville	242,707	13.5	0.6	15.0	1.9	15.5	0.9	*17.6	3.0	36.5	19.8
Lowell	109,081	14.8	0.5	*17.2	3.8	28.7	15.3	65.5	44.5	67.4	67.4
Memphis	154,759	19.9		17.5		19.5		*24.6		42.5	27.0
Milwaukee	453,481	9.4	0.5	10.3	0.6	*12.3	1.5	13.8	1.7	19.3	7.9
Minneapolis	383,442	7.6	0.3	12.0		*12.0	1.5	11.4	1.8	17.0	6.5
Nashville	119,215	16.6	0.9	19.7		17.9	1.3	*23.2	2.2	77.9	56.4
Newark	428,484	11.1		14.0	0.7	*11.2	1.0	17.9	6.4	36.2	23.0
New Haven	154,865	10.4		17.5	0.7	*15.5	5.1	20.9	12.1	41.1	25.9
New Orleans	382,273	17.3	0.7	15.4		16.4	0.4	*21.0	4.0	36.1	19.6
New York	5,215,879	11.1	0.7	*11.4	1.1	12.1	1.9	17.9	7.3	33.1	21.2
Oakland	214,206	10.5	1.0	10.2		10.5	0.5	7.5	0.7	*11.4	4.4
Omaha	180,264	10.4	0.3	10.7		7.8	0.6	11.3	2.0	*26.9	19.7
Philadelphia	1,761,371	11.1	0.6	12.3	0.9	*17.4	2.2	35.3	20.9	95.7	78.0
Pittsburgh	593,303	14.0	1.1	15.2	1.5	*17.7	3.0	20.3	6.1	29.9	10.0
Portland, Ore.											
Providence	263,613	11.3	0.8	*16.6	2.0	16.0	4.4	31.5	19.6	51.6	36.8
Richmond	160,719	17.8	1.3	14.9	1.0	14.6	1.3	*18.8	13.3	57.7	42.5
Rochester	264,856	8.7	0.2	15.0	0.2	13.4	1.4	15.4	1.2	*21.7	7.1
St. Louis	779,951	11.4	0.8	10.8	0.9	11.7	1.3	12.4	1.7	*15.7	5.7
St. Paul	257,699	10.9	0.6	7.9		8.9	0.6	4.9	0.2	*18.6	12.3
San Francisco	478,530	12.6	0.7	14.1	1.5	12.6	1.6	13.2	1.6	*14.4	2.1
Seattle											
Spokane											
Syracuse	161,404	12.0				*24.6	12.3	60.4	44.9	88.5	70.7
Toledo	262,234	9.7	0.4	16.3		13.9	1.0	12.7	0.6	*12.7	1.8
Washington, D.C.	401,681	14.0	1.3	14.4	1.2	*18.4	4.4	39.7	22.5	79.7	63.3
Worcester	173,650	12.3	2.1	*14.7	5.1		30.3		59.8		69.1

NOTE.—Blank spaces indicate that no data is available. * Indicates the beginning of the epidemic. † Indicates the end of the bi

pneumonia (all forms) will be too large a measure if the fashion of diagnosis by physicians and the fashion of assigning causes of death by registrars leads to the compiling of deaths under these causes which should be compiled elsewhere. And *vice versa*, it is conceivable that owing to a desire to maintain the reputation of a city as a healthful spot or for other reasons, the number of deaths assigned to these two causes may be too small.

A few examples of probable errors in the number of deaths assigned to influenza and pneumonia will serve to emphasize the need of caution in attempting to measure the mortality due to the epidemic. One city for the week of October 26 had a death-rate of 91.7, and a death-rate from influenza and pneumonia (all forms) of 50.6. The large difference between these rates (41.1) certainly suggests that too few deaths were assigned to influenza and pneumonia. A similar difference of 44.1 is found for the same city for the week ending November 2, and yet the following week, with corresponding rates of 71.7 and 70.1, the difference was only 1.6.

100,000 Population for Week Ending:

October 19		October 26		November 2		November 9		November 16		November 23		November 30		Total for 12 Weeks	
All Causes	Influenza and Pneumonia (All Forms)	All Causes	Influenza and Pneumonia (All Forms)	All Causes	Influenza and Pneumonia (All Forms)	All Causes	Influenza and Pneumonia (All Forms)	All Causes	Influenza and Pneumonia (All Forms)	All Causes	Influenza and Pneumonia (All Forms)	All Causes	Influenza and Pneumonia (All Forms)	All Causes	Influenza and Pneumonia (All Forms)
72.7	51.0	106.1	86.2	85.2	71.8	33.4	24.1	24.6	9.3	†13.9	1.9	22.7	6.5	37.6	22.9
32.1	20.9	34.1	†26.1	20.4	10.1	21.5	8.0	17.8	7.0	19.6	6.2	19.4		20.5	11.3
147.0	118.0	118.1	93.3	53.3	34.5	27.3	12.8	20.3	4.4	20.7	3.1	18.4	3.5	45.8	27.6
46.7	29.0	45.6	35.1	32.4	22.4	†21.1	12.1	22.7	12.1	25.9	11.6	28.2	19.0	25.3	13.7
50.7	39.1	29.0	15.0	21.2	9.1	17.5	5.0	†15.3	3.1	17.1	3.6	16.0	3.6	38.6	25.0
76.4	58.5	100.3	79.9	67.5	50.1	31.5	18.5	21.9	8.8	†15.6	3.7	17.3	4.0	36.4	21.1
46.8	29.5	24.8	9.8	19.7	8.9	†12.6	2.3	13.1	4.2	18.7	4.2	18.7	3.3	34.3	19.7
57.6	42.3	63.0	47.5	44.0	29.5	26.3	14.8	18.5	7.8	16.0	5.0	15.7	4.4	27.4	15.3
39.4	23.9	49.3	35.1	47.6	30.9	32.7	20.3	25.3	12.1	25.7	13.1	24.6	11.7	27.3	13.3
21.3	10.2	40.7	29.2	56.0	43.9	46.2	33.7	33.3	22.6	25.6	15.4	22.1	12.7	24.8	14.4
33.8	16.9	46.1	27.1	32.2	21.8	20.4	11.6	20.4	8.3	26.2	10.0	29.6	14.8	24.2	10.1
70.6	53.5	64.7	54.7	59.1	45.9	41.1	26.7	†19.2	8.4	15.2	2.0	12.8	5.2	30.2	17.7
97.9	78.0	62.5	39.4	28.0	16.2	19.1	9.7	28.0	5.7	19.1	4.1	14.2		40.9	26.0
12.7	4.2	17.3	8.5	18.9	6.9	14.2	5.0	20.4	11.2	17.7	8.5	19.2		14.8	4.5
38.2	23.0	35.5	20.7	0.4	15.1	20.5	10.4	18.5	8.6	23.8	11.2	32.4		23.2	9.6
		86.9	69.5												
39.9	27.9	45.0	32.1	48.4	32.7	33.7	22.9	26.3	13.3	24.8	10.6	28.6	16.1	28.7	15.0
22.5	12.0	41.1	26.9	48.9	35.0	39.4	28.3	38.1	27.5	28.4	18.0	27.9	15.3	25.3	14.3
57.1	38.7	53.7	38.9	34.2	14.8	23.0	12.5	†20.8	8.4	22.8	7.5	28.6	11.0	28.2	13.2
76.5	55.5	55.9	40.2	30.1	14.3	†17.7	3.8	12.4	3.8	17.2	5.3	11.5	1.0	36.8	21.3
77.8	61.3	73.8	55.9	35.4	23.9			†17.2	5.7	24.6	6.1	16.2	2.0	30.7	16.4
22.4	13.0	29.1	20.1	23.9	14.4	20.5	10.9	17.8	8.0	14.3	5.6	19.3	10.1	17.7	7.9
21.6	13.5	32.2	20.4	27.6	16.3	22.8	12.9	21.9	12.6	15.9	5.4	15.1	5.6	18.1	8.3
103.2	84.4	76.5	55.5	40.7	23.6	43.3	23.2	19.2	6.6	23.6	7.0	29.3	10.1	40.9	22.6
63.7	48.2	67.4	52.4	48.9	45.7	33.0	21.5	27.7	13.5	19.5	8.5	18.7	6.8	30.8	19.0
65.3	51.2	77.4	61.6	75.1	56.6	43.1	27.6	33.7	16.2	20.2	6.7	18.9	8.1	36.6	24.0
106.1	85.1	118.4	93.0	62.1	45.4	35.9	21.6	27.0	10.4	21.7	5.0	22.2	5.9	41.6	24.3
56.6	42.3	67.8	52.2	58.2	44.0	35.6	22.8	22.8	10.5	17.9	6.6	15.8	4.2	30.0	17.8
23.1	10.2	46.3	33.6	67.9	57.7	47.5	38.2	29.5	17.0	20.4	7.5	12.7	2.4	24.8	15.5
55.0	46.3	54.4	42.5	37.0	27.2			25.5	13.9	18.5	11.0	21.1		24.8	13.9
156.0	136.1	107.7	89.4	52.4	35.6	23.7	11.1	18.1	4.9	†16.2	3.0	13.4	2.8	46.6	33.1
50.9	34.2	91.7	50.6	99.5	55.4	71.7	70.1	60.8	46.8	45.8	33.8	37.9	12.2	46.3	27.2
68.8	50.4	61.7	43.1	39.8	26.7	26.3	12.9	20.0	7.1	†18.4	6.5	15.6	4.5	31.6	17.9
87.3	63.9	65.2	41.5	32.4	23.0	24.0	9.1	22.1	7.5	24.3	4.2	17.2	7.8	33.0	18.0
32.9	20.1	53.7	41.9	50.0	41.1	28.9	20.5	20.5	10.2	17.7	7.9	20.3	7.3	24.8	13.3
25.3	12.4	27.3	15.6	28.4	17.2	26.2	15.3	26.5	15.2	25.3	12.7	27.4	15.7	20.7	9.5
25.1	15.2	22.5	11.5	30.1	20.6	34.4	22.1	36.2	27.3	27.3	17.8	22.5	12.5	20.8	11.5
31.3	14.2	75.9	60.1	87.6	80.4	67.2	45.1	36.0	21.6	23.0	9.8	18.4	6.1	33.9	20.4
95.0	81.7	58.2	45.2	30.7	22.0	20.7	9.0	22.6	7.4	†11.6	2.3			42.4	26.9
22.7	9.7	39.6	27.4	34.8	22.9	29.6	17.1	21.3	9.1	17.5	8.4	17.1	5.6	20.2	8.7
100.5	80.7	65.6	50.5	39.2	23.5	20.9	7.1	†18.3	5.5	18.0	4.8	18.6	5.5	37.3	22.5
61.0	48.0	46.8	26.7	30.6	17.7			†13.8	3.9	15.9	8.7	18.3	3.6		

mortality wave.

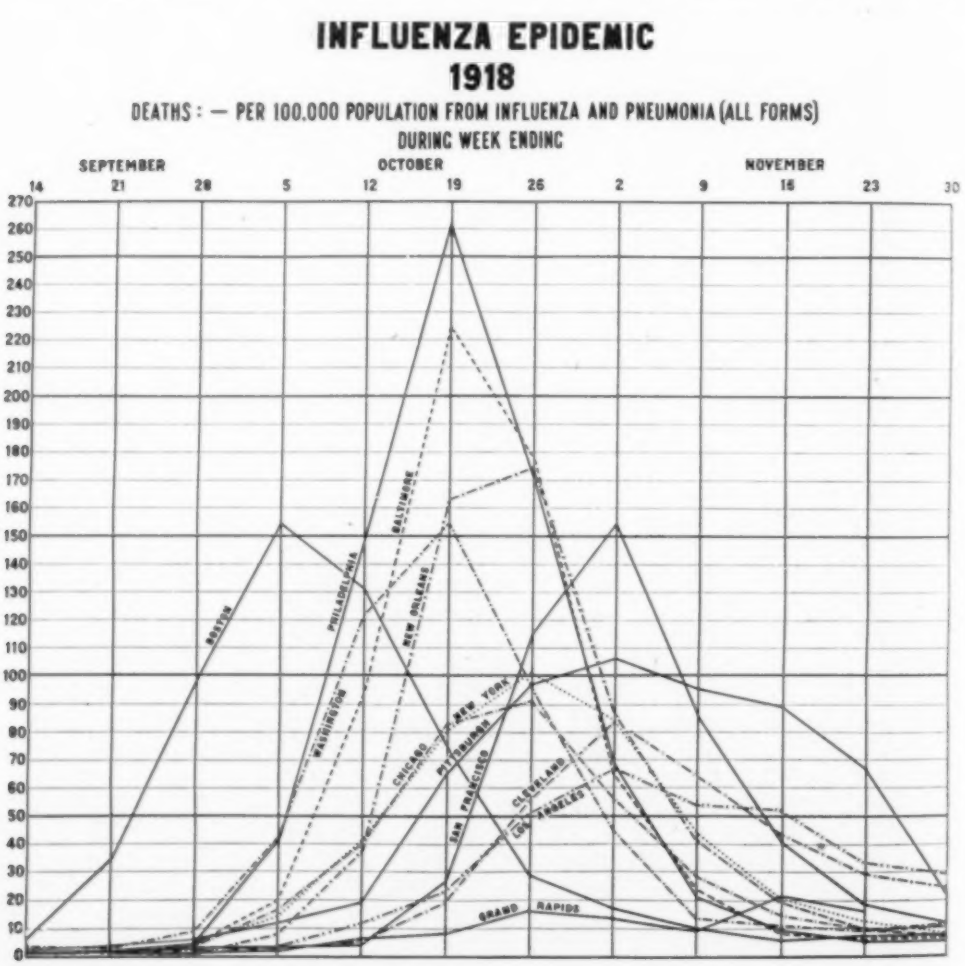
Probably, therefore, the best way is to measure the epidemic by both methods and then attempt to reconcile any great differences found. The toll per 1,000 as determined by both these methods is given in the *Index* for the week ending November 30. And in the same issue it also appears that the death-rates have so nearly approached their normal levels that only nine are above 25 and only two, Pittsburgh and Indianapolis, above 30. The tables of the November 30 *Weekly Health Index* appear at the end of this paper. For purposes of comparison the column of deaths from influenza and pneumonia in September, October, and November, 1917, has been added to the summary table.

Reduced to annual rates the picture is shown in chart on page 53, each bar representing the annual rate from all causes for the twelve-week period so far as reported, and the solid portion of the bar the annual rate from influenza and pneumonia (all forms).

Similar rates for each week for each city are given in the table on pages 54–55.

Curves showing the mortality per 100,000 population for influenza and pneumonia (all forms) for each week are shown for a few cities in chart below.

Why do these curves vary so much? A



study of the differences in the peoples affected, differences in their modes of living and employment, differences in climatic conditions, etc., etc., will doubtless lead to partial explanations, at least. Apparently it is not simply a question of time, for the curves for Boston, Washington, and San Francisco are almost identical.

But I am digressing, for the function of the *Weekly Health Index* is to point out differences, not to explain them.

Weekly Health Index.

As a health index the Bureau of the Census is publishing each week mortality reports from the largest cities in the United States.

There are given for each city the total number of deaths reported (stillbirths

SUMMARY

INFLUENZA EPIDEMIC

(Covering 12 weeks ending September 14 to November 30, inclusive)

Cities in order affected	First week	Maximum week	Week when death rate (all causes) reached normal level	Deaths from influenza and pneumonia (all forms)		Excess deaths[c] from all cause		FOR COMPARISON Number of deaths from influenza and pneumonia (all forms) in September, October, November, 1917.[c]
				Number	Number for 1,000 population	Number	Number for 1,000 population	
Boston	September 14	4th	10th	4610	5.7	4292	5.5	290
Worcester	September 21	"	9th	919	5.3	a		43
Lowell	" "	"	8th	534	4.9	520	4.8	28
Fall River	" "	"		b 704	5.5	781	6.1	23
Providence	" "	5th	10th	1086	4.1	1106	4.2	73
New York	" "	6th		21514	4.1	19988	3.8	1,919
Cambridge	September 28	2nd	7th	504	4.5	558	5.0	85
Syracuse	" "	4th	9th	b 915	5.7	a		38
New Haven	" "	5th		b 783	5.1	785	5.1	52
Wasnington	" "	4th	8th	2082	5.2	1997	5.0	102
Jersey City	" "	"				a		111
Pittsburgh	" "	7th		3710	6.3	4003	6.8	494
Philadelphia	" "	4th	9th	13025	7.4	13029	7.4	583
Indianapolis	" "	4th		b 584	2.0	570	2.0	72
Chicago	" "	5th		9133	3.5	8490	3.3	928
Buffalo	" "	"	9th	2293	4.8	2289	4.8	166
Baltimore	" "	4th		3612	6.4	3921	6.5	261
Milwaukee	" "	5th		821	1.8	777	1.7	104
Minneapolis	" "	"		b 671	1.7	629	1.6	78
Birmingham	" "	"	7th	622	3.1	319	1.6	109
Newark	" "	"		1873	4.4	1792	4.2	100
Richmond	October 5	3rd		667	4.2	615	3.8	57
Kansas City	" "	5th		1085	3.5	a		70
New Orleans	" "	4th		2134	5.6	2127	5.6	114
Denver	" "	"		904				60
Louisville	" "	"	7th	735	3.0	756	3.1	80
Columbus	" "	"		526	2.3	524	2.3	50
Cincinnati	" "	"		1280	3.1	1227	2.9	120
Nashville	" "	3rd		680	5.2	694	5.6	45
Atlanta	" "	4th	5th			226	1.1	77
Los Angeles	" "	5th		1877	3.3	1838	3.2	103
Cleveland	" "	"		2696	3.3	2325	2.9	223
Albany	" "	4th	9th	592	5.3	560	5.0	26
Memphis	" "	3rd	7th	b 534	3.4	a		42
Omaha	October 12	2nd		b 527	2.9	a		55
St. Paul	" "	6th		b 634	2.4	632	2.5	43
Seattle	" "	3rd		703				40
Dayton	" "	"	6th	533	4.1	441	3.4	44
Rochester	" "	"		806	3.1	613	2.3	69
St. Louis	" "	4th		1714	2.2	1417	1.8	287
Oakland	" "	"		b 702	3.3	750	3.5	44
Grand Rapids	" "	6th		b 128	0.9	137	1.0	15
Spokane	" "	3rd		b 246				16
Portland	" "	4th		676				51
San Francisco	" "	"		2247	4.7	2151	4.6	142
Toledo	" "	3rd		523	2.0	427	1.6	41

a Complete data not received.
b Deaths for eleven weeks only.
c Excess deaths means the number of deaths from all causes in excess of the number which it is estimated would have occurred under normal conditions.

excluded), the death-rate, the number of deaths under one year of age, and the proportion of infant deaths to total deaths.

Where the data are obtainable for the previous five years, averages for the corresponding weeks are given for each city.

INFLUENZA EPIDEMIC

CITY	Deaths from pneumonia (all forms) during week ending[a]										
	September		October			November					
	14-28	5	12	19	26	2	9	16	23	30	Total
Total	1573	2044	4606	7649	7732	5103	2667	1848	1320	926	35468
Albany	4	2	11	22	34	24	7	6	0	6	116
Atlanta	11	7	25	42	86	39	31	27	24		292
Baltimore	31	87	371	793	600	204	75	30	36	31	2258
Birmingham	8	11	9	12	19	15	9	11	9	15	118
Boston	295	225	177	126	52	38	21	20	21	20	995
Buffalo	36	41	98	125	134	90	38	20	6	16	604
Cambridge	34	27	15	13	4	6	2	4	5	3	113
Chicago	113	246	476	863	826	456	250	155	105	69	3559
Cincinnati	15	15	20	21	19	14	16	9	17	16	162
Cleveland	23	15	22	64	106	153	102	82	54	52	673
Columbus	11	10	13	28	21	9	8	10	4	8	122
Dayton	5	5	11	38	43	31	10	4	5	3	155
Denver	14	19	25	19	34	28	27	26	23	34	249
Fall River	11	11	9	23	10	6	5	7	2		84
Grand Rapids	3	3	7	6	15	15	7	17	14		87
Indianapolis	19	24	16	110	97	71	47	39	53		476
Jersey City	29	50	144		225						448
Kansas City, Mo.	15	11	21	55	75	55	35	34	24	39	364
Los Angeles	16	14	41	31	49	53	37	47	20	23	331
Louisville	16	14	77	154	157	60	50	37	32	42	639
Lowell	25	64	104	85	65	19	6	6	7	1	382
Memphis			67	152	127	60		15	13	6	440
Milwaukee	22	15	54	83	126	90	73	55	34	69	621
Minneapolis	13	13	11	10	22	16	9	10			104
Nashville	5	5	29	47	27	13	10	7	6	13	162
Newark	12	22	70	126	137	138	62	39	24	22	652
New Haven	6	6	9	22	29	27	10	13	3		125
New Orleans	8	17	49	177	233	117	60	33	11	22	727
New York	317	434	1142	2009	2251	1855	1070	568	365	80	10091
Oakland	6	3	11	21	25	28	16	15	7		132
Omaha	3	7	22	22	7	10		12	4		87
Philadelphia	128	307	938	1644	1182	467	157	80	53	67	5023
Pittsburgh	62	57	102	161	457	537	192	230	173	117	2088
Portland	7	3	8	25	11	16	6	3	5	2	86
Providence	36	38	61	62	48	32	16	13	11	8	325
Richmond	9	20	42	73	43	b	3	7	9	7	213
Rochester	9	6	22	25	28	33	20	9	4	8	164
St. Louis	45	25	46	76	75	87	65	54	65	83	621
St. Paul	6	1	30	11	10	11	11	15	9		104
San Francisco	35	15	19	42	58	59	38	24	18	14	322
Seattle	10	6	16	22	7	17	5	6	3	4	96
Spokane	3	1	2	5		3	6	3	1		24
Syracuse		14	3	50	32	10	8	7	2		126
Toledo	7	3	7	19	43	41	33	18	9	7	187
Washington, D.C.	36	57	101	97	61	36	14	13	16	19	450
Worcester	54	68	53	38	22	14		8	14	b	271

a Blank spaces indicate that no report has been received.
b Included with deaths from influenza.

As weekly figures always fluctuate widely, caution must be used in their interpretation. However, these totals, rates, and percentages permit valuable comparisons and serve as a ready health index for health officers and others.

INFLUENZA EPIDEMIC

City	Deaths from influenza during weeks ending[a]										
	September		October			November					
	14-28	5	12	19	26	2	9	16	23	30	Total
Total	1122	2715	6814	12290	13114	9754	5806	3217	2226	1741	58,799
Albany			34	88	152	131	45	14	4	8	476
Atlanta			5	39	15						59
Baltimore	?	30	192	564	473	193	72	21		9	1554
Birmingham	1	5	52	98	114	70	37	35	35	57	504
Boston	791	989	850	463	174	99	55	27	33	34	3515
Buffalo	?	7	82	406	591	365	130	60	28	20	1689
Cambridge	82	113	100	50	17	13	3	5	4	4	391
Chicago	18	171	571	1242	1541	1014	488	235	146	148	5574
Cincinnati		3	47	171	262	234	147	88	88	78	1118
Cleveland		3	18	94	347	529	422	269	186	145	2013
Columbus		?	15	45	96	85	42	26	39	56	404
Dayton			20	96	94	84	57	17		10	378
Denver		?	34	120	113	80	74	51	85	98	655
Fall River	18	86	192	169	87	34	19	7	8	5	625
Grand Rapids			?	5	7	3	6	12	8		41
Indianapolis	?	?	30	18	18	13	11	9	9		108
Jersey City	?	16	87		200						303
Kansas City, Mo.		26	75	113	118	142	103	46	40	58	721
Los Angeles		?	28	100	244	329	272	253	176	144	1546
Louisville		?	15	26	24	9	8	2	3	9	96
Lowell	16	29	37	31	19	11	2	2	4	1	152
Memphis			13	30	39	11		2	5		100
Milwaukee	?	?	15	30	49	35	22	15	15	19	200
Minneapolis	?	?	37	89	128	104	86	83	40	41	608
Nashville			100	146	100	41	43	8	10	10	458
Newark	2	31	119	270	294	238	115	72	46	34	1221
New Haven	11	30	68	130	154	141	72	35	17	18	676
New Orleans		12	95	447	449	216	98	43	26	21	1407
New York	54	299	979	2218	2971	2547	1207	485	292	181	11223
Oakland			7	21	113	209	141	55	31	10	587
Omaha			46	188	140	84		36	34		478
Philadelphia	?	399	1697	2953	1839	736	218	84	50	26	8002
Pittsburgh	1	12	12	228	119	93	606	302	212	22	1607
Portland			?	16	83	141	150	64	80	36	590
Providence	?	61	125	193	170	103	49	23	22	15	761
Richmond	2	21	89	124	85	71	25	16	4	17	454
Rochester			14	77	185	176	84	43	36	29	644
St. Louis			40	110	158	170	164	174	125	152	1093
St. Paul			31	64	47	91	98	120	79	62	592
San Francisco			?	88	494	679	376	174	72	42	1925
Seattle			59	86	153	92	80	63	31	43	607
Spokane			2	14	40	16	65	43	29	33	242
Syracuse	38	125	216	203	108	58	20	16	5		789
Toledo			2	30	95	74	53	28	33	21	336
Washington, D. C	17	116	387	525	328	145	41	29	21	23	1632
Worcester	71	121	177	122	67	45		5	15	12	645

a Blank spaces indicate that no report has been received.

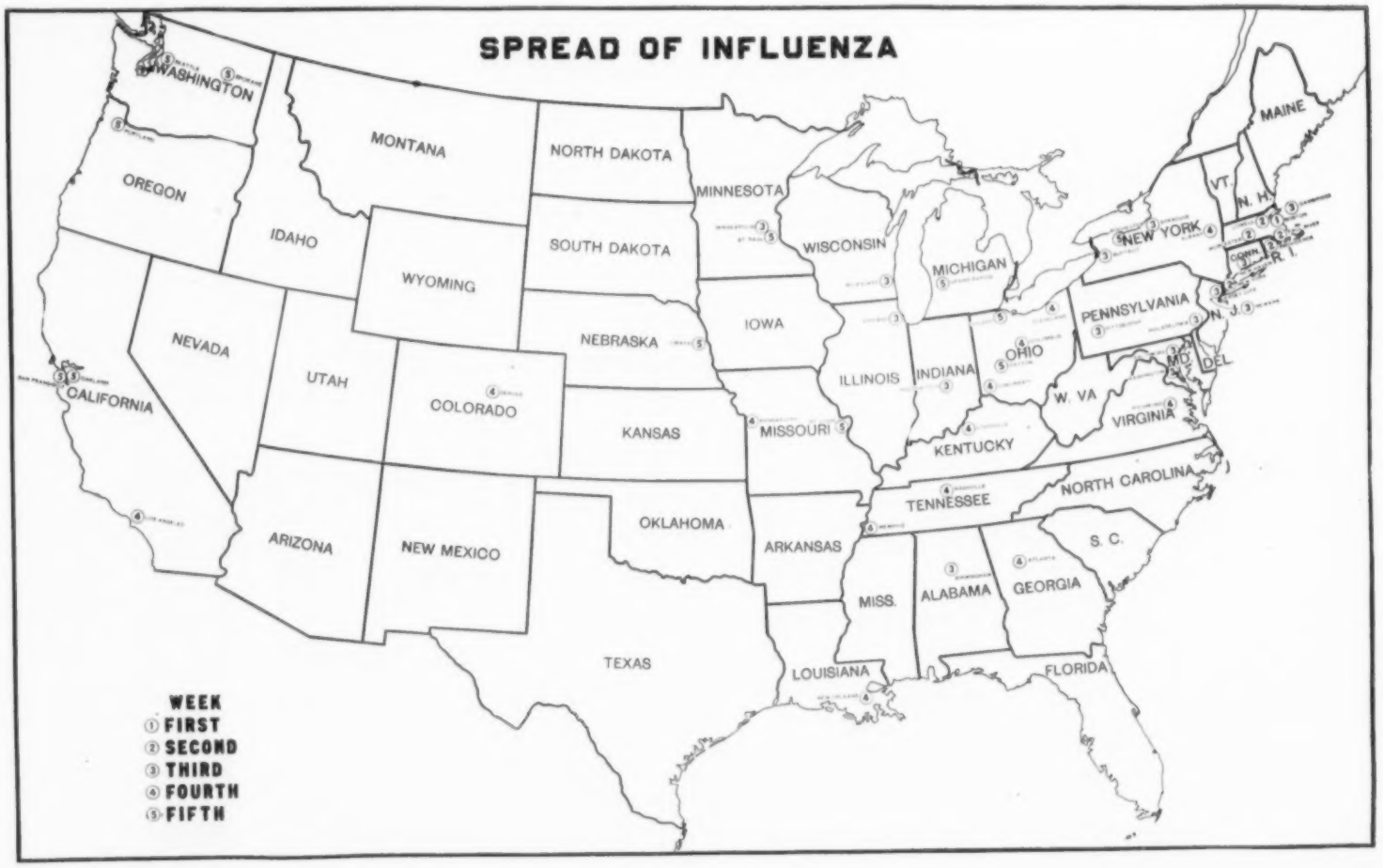
? The abnormal number of deaths reported from pneumonia (all forms) makes it seem probable that some of these deaths were due to epidemic influenza.

DEPARTMENT OF COMMERCE
Bureau of the Census
Washington

Deaths (stillbirths excluded) reported during the week ending November 30, 1918, with death rates, in large cities of the United States.

CITY.	Estimated population July 1, 1918.[a]	Week ending November 30,1918.				C = Corresponding week, 1917 A = Average of corresponding weeks, 1913-1917.			
		Total deaths	Death rate[b]	Deaths under 1 year	Deaths under 1 year per cent of total	Total deaths	Death rate[b]	Deaths under 1 year	Deaths under 1 year per cent of total
Total.	21,534,648	8,276	1960	832	10.1	c	c	c	c
Albany[d]	112,565	49	22.7	3	6.1	C 27.	12.7	4	14.8
Atlanta	201,732	75	19.4	2	2.7	C 57	15.2	2	3.5
Baltimore[d]	599,653	212	18.4	25	11.8	A 184	16.4	28	15.3
Birmingham	197,670	107	28.2	7	6.5	A 59	17.6	7	11.3
Boston	785,245	241	16.0	36	14.9	A 223	15.5	31	13.7
Buffalo	473,229	157	17.3	24	15.3	A 101	11.6	19	18.6
Cambridge	111,432	40	18.7	3	7.5	A 31	14.6	5	15.0
Chicago	2,596,681	781	15.7	94	12.0	A 607	12.9	103	17.0
Cincinnati	418,022	197	24.6	15	7.6	C 128	16.1	17	13.3
Cleveland[e]	810,306	343	22.1	15	4.4	C 175	11.7	24	13.7
Columbus	225,296	128	29.6	7	5.5	C 42	10.0	1	2.4
Dayton	130,655	32	12.8	5	15.6	A 36	14.8	5	13.5
Denver	g	201	g	7	3.5	A 64	g	c	c
Fall River[d]	128,392	35	14.2	5	14.3	C 31	12.7	12	38.7
Grand Rapids	135,450	50	19.2	5	10.0	C 32	12.6	4	12.5
Indianapolis	289,577	180	32.4	6	3.3	C 85	15.7	10	11.8
Kansas City, Mo.	313,785	172	28.6	15	8.7	C 80	13.6	5	6.3
Los Angeles	568,495	304	27.9	21	6.9	A 129	14.2	16	12.1
Louisville	242,707	133	28.6	4	3.0	C 78	16.9	9	11.5
Lowell	109,081	24	11.5	6	25.0	A 26	12.7	3	10.6
Memphis	154,759	48	16.2	3	6.2	C 48	16.5	3	6.3
Milwaukee	453,481	168	19.3	28	16.7	A 94	11.4	18	18.8
Minneapolis	383,442	111	15.1	12	10.8	C 73	10.2	13	17.8
Nashville	119,215	67	29.3	4	6.0	C 30	13.2	1	3.3
Newark	428,684	154	18.7	27	17.5	A 103	13.4	c	c
New Haven	154,865	56	18.9	5	8.9	C 51	17.5	9	17.6
New Orleans	382,273	163	22.2	15	9.2	A 150	21.3	18	12.0
New York	5,215,879	1,577	15.8	200	12.7	A1362	14.1	207	15.2
Oakland	214,206	52	12.7	1	1.9	A 44	12.0	5	10.5
Omaha	180,264	73	21.1	10	13.7	C 40	12.4	4	10.0
Philadelphia[f]	1,761,371	454	13.4	67	14.8	482	14.7	62	12.9
Pittsburgh	593,303	431	37.9	39	9.0	C 213	18.9	37	17.4
Portland, Oreg.	g	78	g	9	11.5	C 62	g	10	16.1
Providence	263,613	79	15.6	10	12.7	C 73	14.7	10	13.7
Richmond	160,719	53	17.2	3	5.7	C 49	16.1	7	14.3
Rochester	264,856	103	20.3	12	11.7	C 68	13.7	7	10.3
St. Louis	779,951	410	27.4	24	5.9	C 197	13.4	18	9.1
St. Paul	257,699	111	22.5	9	8.1	C 60	12.4	5	8.3
San Francisco	478,530	169	18.4	10	5.9	C 141	15.6	4	2.8
Seattle	g	118	g	12	10.2	A 46	g	3	6.9
Spokane	g	50	g	2	4.0	C 19	g	1	5.3
Toledo[e]	262,234	86	17.1	9	10.5	A 57	13.1	9	15.4
Washington, D.C.	401,681	143	18.6	8	5.6	A 119	16.5	13	11.0
Worcester	173,650	61	18.3	8	13.1	C 52	15.9	13	25.0

[a] Populations have been estimated by the arithmetical method based upon the Federal and state censuses except when otherwise indicated.
[b] These rates represent annual rates per 1,000 estimated population.
[c] Not available.
[d] Deaths for week ending Friday, November 29, 1918.
[e] Population estimated by an alternative method.
[f] Figures for average deaths are based on statistics of 1915, 1916, and 1917.
[g] No estimate of population made.


SPREAD OF INFLUENZA
WASHINGTON
OREGON
CALIFORNIA
IDAHO
NEVADA
MONTANA
WYOMING
UTAH
ARIZONA
COLORADO
NEW MEXICO
NORTH DAKOTA
SOUTH DAKOTA
NEBRASKA
KANSAS
OKLAHOMA
TEXAS
MINNESOTA
IOWA
MISSOURI
ARKANSAS
LOUISIANA
WISCONSIN
ILLINOIS
MICHIGAN
INDIANA
OHIO
KENTUCKY
TENNESSEE
MISS.
ALABAMA
GEORGIA
FLORIDA
S. C.
NORTH CAROLINA
VIRGINIA
W. VA
PENNSYLVANIA
NEW YORK
MD.
DEL.
N. J.
CONN.
R. I.
VT.
N. H.
MAINE
WEEK
① FIRST
② SECOND
③ THIRD
④ FOURTH
⑤ FIFTH

PUBLIC SCHOOLS OF CHICAGO DURING INFLUENZA EPIDEMIC, 1918.

H. O. Jones, M. D.
Dept. of Health, Chicago, Ill.

Discussion before the American Public Health Association at the Meeting at Chicago, December 10, 1918.

I RESPECTFULLY submit the following report of Chicago's experience during the recent influenza epidemic with reference especially to the public and parochial schools:

With the spread of the influenza epidemic and the threatened outbreak of this disease in Chicago the question as to whether or not the public and parochial schools in which about 500,000 children assemble daily should be closed was a serious problem, especially so, since in many other cities a precedent of closing schools had been established.

A conference of prominent representatives of the various agencies actively interested in the children's welfare was called September 28 by the commissioner of health, and the question of closing schools was thoroughly debated. It was noted that the sanitation in our schools is uniformly good and that the hygienic conditions of environment are better in schools than those which obtain among the children when classes are discontinued. When in school the children are under the observation of doctors, nurses and teachers, while on the outside there is no limit to their possible contact, under conditions in which this supervision is lacking. The consensus of opinion was in favor of keeping the schools open for the following reasons:

1. A better knowledge of existing conditions would be acquired when the schools were made a source of information as to sickness among the children and their families.

2. It would be possible to supervise the children and keep many of them under better environment during the school hours than if they were allowed to stay at home and run in streets and alleys, or play on premises where persons sick with the disease are domiciled.

3. Because we have an organized staff of physicians and nurses for medical inspection of schools.

Having decided to keep the schools open plans were formulated to increase the safeguards of the children as far as possible.

The superintendent of schools was requested to arrange that the classrooms be so heated as to permit thorough frequent flooding of all rooms with fresh air, without chilling the children, and that the rules against dry sweeping be strictly enforced in the school buildings. These requests were made and complied with because it was agreed that fresh air and freedom from dust, the avoidance of chilling and everything that tends to reduce vitality were primary requisites in combating influenza.

With the increasing prevalence of the epidemic another letter was sent to the superintendent of schools requesting that all classrooms in all schools be made open-window rooms, that is that windows remain open all the time in all the rooms, heat being supplied and the children being permitted to wear their street wraps to avoid any possible chance of becoming chilled. The object of this last request which was complied with was to supply the maximum of fresh air.

In addition to these measures the routine medical work in schools was discontinued and the staff of physicians and

nurses concentrated on inspection of school children for contagious diseases, especially influenza. The staff excluded all children found having any signs of the disease or prodromal symptoms; and all children coming from a home where there was a case of influenza. Teachers made inquiry each morning for any pupils not feeling well and referred such children to the school doctor for an examination. All absentees were subject to a rigid inspection and examination before being permitted to rëenter school.

The school health officers and nurses visited the homes of as many absentees as possible and where sickness was found they instructed the families as to the proper isolation of the patient and the care and protection of themselves. They notified the Department of Health of influenza cases found and also reported when they discovered a family that needed medical assistance or relief.

During the month of October approximately 300,000 inspections of school children were made by the school physicians. During the epidemic the nurses made 30,000 house calls.

A study of the absentees by days during the period October 4 to November 12 shows that the peak of absences occurred at the time when the epidemic was at its height. Absentees averaged about 25 to 30 per cent for this period—the northwest and south side being affected about equally.

The home calls showed that absence of pupils was only in part due to illness of the children, some was due to illness or death in the family and some to the voluntary keeping of children from school by parents for fear of contracting the disease.

An analysis of 15,000 reported cases shows about 14 per cent occurred in children under eighteen years of age. An analysis of the mortality from influenza and pneumonia by school age groups during the period September 22 to November 12 is as follows:

Ages	Influenza	Pneumonia
5 to 10	5.29%	4.46%
10 to 15	2.55%	2.67%
15 to 20	4.31%	3.55%

We believe that in view of the results just noted that the decision of keeping the schools of this city open during the recent influenza epidemic was justified.

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AMERICAN JOURNAL OF PUBLIC HEALTH
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LEE K. FRANKEL, PH. D.

THE NEW OFFICERS OF THE A. P. H. A. AND THE WORK OF NEXT YEAR.

The following officers were elected at the Chicago meetings of the Association:

President, Lee K. Frankel, Ph. D., New York City.
1st Vice-President, Lt.-Col. J. W. S. McCullough, C. A. M. C., Toronto, Ont.
2nd Vice-President, Col. Victor C. Vaughan, M. C., Washington, D. C.
3rd Vice-President, John D. Robertson, M. D., Chicago, Ill.
Treasurer, Guilford H. Sumner, M. D., Des Moines, Iowa.
Secretary, A. W. Hedrich, Boston, Mass.

Together with the president, treasurer and secretary, the following will compose the Executive Committee, with terms expiring as noted:

A. J. McLaughlin, Asst. Surgeon General, U. S. P. H. S. (1921).
W. A. Evans, M. D., Chicago, Ill. (1921).
Charles J. Hastings, M. D., Toronto, Ont. (1920).
Peter H. Bryce, M. D., Ottawa, Ont. (1920).
W. C. Woodward, M. D., Boston, Mass. (1919).
J. N. Hurty, M. D., Indianapolis, Ind. (1919).

A complete list of the Board of Directors appears elsewhere in this issue.

Three important and specific problems that confront the Association for the coming year are the following: the establishment of a popular health magazine, the organization of state health societies; and the taking of first steps in co-relating the numerous health societies which exist today. All three of these are related to a fundamentally new policy adopted by the Board of Directors to engage in a program of positive health building, in addition to the more negative activity of disease prevention or mitigation. This is in harmony with a resolution passed by the recent Conference on Reconstruction, held in New York City.

More will be said concerning these matters as soon as the Executive Committee can meet and formulate a definite program.

No one could have been found better qualified to assume leadership in these important matters than our new president, Dr. Lee K. Frankel. His activities during the past few years as treasurer and member of the Executive Committee, have given him intimate knowledge of the affairs of our Association. On the other hand, he has long had close and constant contact with every national public health agency of importance on the continent. Along with this ripe experience, Dr. Frankel brings a genius for organizing; for analyzing problems, conceiving adequate plans of action and putting them into effect; for bringing coöperation out of personal maladjustments —in short for getting big things done. A fine tribute to his ability was his appointment as chairman of the emergency Influenza Commission of New York City, during the recent epidemic.

A strong Executive Committee has been elected. But Napoleon, and the wisest cabinet under heaven could not build an empire by themselves; nor can our officers reach the goal set by the Association without the most generous help. The president and Executive Committee will, during the next year ask every member of the Association for coöperation in letters and through the columns of the JOURNAL. Let every member respond to the limit of his ability.

DR. BRYCE ELECTED TO HONORARY MEMBERSHIP.

Last year a Canadian, Dr. Charles J. Hastings, honored the Association as president; and those who were privileged to attend the sessions over which he presided, congratulate themselves over this fact.

During the Chicago meetings, the Association elected to honorary membership another Canadian, Dr. Peter H. Bryce, former president of the Association. Dr. Bryce has been a member of the Association since 1883—thirty-five years ago. During this time, he has given freely of his time and energy to the public health cause. The honorary membership comes as a richly deserved token of the affectionate regard of the public health profession.

OUR KNOWLEDGE CONCERNING INFLUENZA.

When Noah received warning of the coming of the flood, he did not bother about the distant future, but provided for what he knew would happen in the immediate future. He built his ark, loaded her up with a pair of each animal species, and persuaded as many of his relatives as possible to come in. It probably didn't occur to Noah, at all, to have a few control arks set up in other lands for corroborative evidence, or to post a few weather prophets in various places for the benefit of science. If he had, more than likely his relatives would have taken command from him and chained him in the hold of the ark. As a result, the world now lacks a great deal of interesting information concerning the flood.

Much the same kind of thing seems to have happened in the recent epidemic of influenza. So great was the pressure for action, that very few were able to devote any time to observation for the sake of the future. The health officer did the best he could by way of prevention, and then devoted himself to save as many of the sick from dying, as possible. Had he done otherwise, probably he would have been accused of day-dreaming during a calamity.

We find, therefore, that our data concerning the disease are in many cases incomplete or confused, and that few definite conclusions can be drawn at this time. Disagreeable as is this situation, it is better than "to know some things that ain't so."

The influenza reference committees are entitled to great credit for their promptness in reporting. Within forty-eight hours after the close of the meetings of the Association, a sixteen-page bulletin was on its way to all who registered at the Convention. The report is reprinted in this issue of the JOURNAL, and states concisely what can be said about influenza under our present knowledge. The committees will present later reports as soon as more information becomes available.

Following are some of the more important statements made by the committee:

The causative organism is as yet unknown.

No vaccine tried against influenza has to date proved its efficacy, but anti-pneumococcic vaccines against the sequelæ show more promise.

The use of convalescent serum in treatment seems to be valuable.

More well-controlled experiments must be made with face-masks, before the utility of general masking of the population can be determined.

The exact modes of transmission are somewhat in doubt. New evidence has been introduced tending to show that at least in army camps, improperly washed (unboiled) eating and drinking utensils were responsible for part of the spread.

Whether or not it pays to "close up" a town depends upon local conditions.

Probably not less than 400,000 have died from the epidemic in the United States to date.

THE MOST SUCCESSFUL MEETING IN OUR HISTORY.

The registration at the Chicago meetings was almost an even thousand, which was about fifty per cent higher than the attendance at Washington, D. C., last year. Many more came who did not register, so that the large Banquet Hall of the Morrison Hotel was more than once filled to capacity.

The thorough preparations of the local committees, under the general chairmanship of Dr. W. A. Evans commanded the admiration of all.

The most striking innovations were the exhibits, of which twenty were of a strictly scientific nature, and twelve, commercial. A committee headed by Dr. D. J. Davis was responsible for the first and another under Dr. Arthur R. Reynolds provided the second. Both exhibits were highly successful, and we may assume that the practice will become a permanent one at our annual meetings, for both exhibitors and convention guests were very enthusiastic over the first trial.

A second departure contributed by the energetic Chicagoans was the *Daily Bulletin*, which greeted the guests each morning. The first page showed a new cartoon each day. On the first day, ten officers and members of the Association were astonished to find themselves caricatured by De Beck of the Chicago Herald-Examiner, who in a capricious moment had pictured them standing in a row singing, "We're here because we're here." It soon became apparent, however, that the Association was there for business, and, as one member remarked "not for riotous living."

Mr. E. R. Pritchard, Secretary of the Chicago Health Department, was originally in charge of the Bulletin, and, therefore, incurred the wrath of the individuals pictured on the "We're here" cartoon. Beginning with the first day, however, the newspaper reporters kept Mr. Pritchard so busy hunting up "flu stories," that he was compelled to delegate the editing of the "Bulletin" to Dr. Ethan A. Gray. Thereafter the cartoons became more dignified, depicting, for example, the Association as a be-spectacled little professor standing on a pile of scientific books, injecting "flu serum" into an agonized Uncle Sam, by means of a syringe about the size of a ten-gallon ice-cream freezer can.

The other features of the "Bulletin" include registration lists and general announcements.

All of this took money, but the general chairman had wisely put the resourceful Health Commissioner of Chicago, Dr. John Dill Robertson, in charge of the finance committee, with the result that not only does the Association leave Chicago with all expenses paid, but a comfortable surplus will be turned into the Association treasury. The Health Department laboratories, chart-rooms, clinics, and sanatoria were also thrown open to the convention guests, with the result that many returned to their cities with new information and enthusiasm for their local work; for the Chicago Health Department, with its annual appropriation of two million dollars, has built up a remarkably efficient organization.

A committee under the chairmanship of Mr. Langdon Pearse arranged for trips to places of interest. The best attendance was at the trip to the Union Stock-yards. The guests were shown through the plant of Swift and Co., were dined, and returned to convention headquarters seemingly very contented, despite the distinctive Stock-yards odor which, in diluted form, returned with them. It was formerly said that the packers utilized all of the pig except the squeal; but when trade relations are again established with Germany, a brisk export trade in this last product is to be expected.

Dr. H. O. Jones was in charge of meeting places, Dr. Heman Spalding of hotels, and Mrs. Alice Wood of entertainment of ladies.

Over two hundred and fifty new memberships have come to the Association as a result of the meeting, and this was largely due to the untiring work of the committee headed by Dr. C. St. Clair Drake and Dr. I. D. Rawlings. Dr. H. N. Bundesen, chairman of the entertainment committee, was especially active at the registration desk and helped many a prospective member over the river of doubt by courteously explaining the aims, work and benefits of the Association. This committee was also responsible for the admirable convention badge.

The Association is indebted to the Hotels Morrison and LaSalle. The Morrison furnished gratis most of the meeting rooms and two whole floors for exhibits and head-

quarters, and the LaSalle housed the meetings of two sections. The courtesy and efficiency with which the arrangements were made deserve commendation.

Shortly before the close of the Tuesday night session, the meeting voted to move forward the section meetings of Thursday morning, in order to allow more time for general influenza discussion. This upset the plans for room assignments, including those for a round-table luncheon, and caused the only noticeable hitch in the convention. This is to be expected, however, when sudden changes are made from the printed program, and in no way reflects upon the hotel or the local committees.

The Association of Commerce of Chicago contributed the most valuable coöperation both before and during the meetings. Not only did Mr. Armstrong of the Convention Bureau arrange for registration clerks, but he was in personal charge of the registration desk most of the time. Miss Mae Brown, secretary to Dr. Evans, performed valuable service in supervising general headquarters.

To all these generous coöperators, the Association owes a great debt of gratitude. There are many others whom we cannot mention personally, for fear of unduly prolonging this article. They have given the Association its best meeting, and have set an example which will guide our hosts in the future.

CORRECTION

On the cover of the December, 1918, issue reference was made to the free health employment services of the Association extended to sanitarians who are returning from the war. The reader was referred, at the same time, to page xviii, which was an advertising announcement. This should have referred, instead, to page 928, upon which full details concerning the health employment services of the Health Association were given. The annual meeting necessitated the reading of proof by an assistant unfamiliar with the routine, which accounts for the error.

Members who went to Chicago will recognize this picture of Hotel La Salle, which treated the company in royal good fashion.

ASSOCIATION NEWS

HELP WANTED.

In order to help relieve the shortage of sanitarians due to the war, free help-wanted announcements will be carried in this column until further notice. Copy goes to the printer on the fifteenth of each month. In answering keyed advertisements, please mail replies separately.

The Health Employment Bureau also sends lists of applicants to prospective employers without charge.

Graduate physician as surgeon in Pennsylvania manufacturing plant employing about 5,500 men. Surgeon to take charge of Main Dispensary and three auxiliaries, all thoroughly equipped; also to examine all employees. Salary from $3,000 to measure up to ability of the individual. Address No. 177, J. E. W., care of this JOURNAL.

Superintendent of health in Connecticut who must be a graduate physician. Executive staff consists of twelve employees with bacteriological laboratory. Salary, $2,500 with prospect of advance to $3,000 in a short time. Address No. 181, R. E. T., care of this JOURNAL.

Laboratory worker to take charge of branch laboratory in North Dakota. Straight public health work, milk and water examinations, with whatever clinical examinations in the way of urine analyses, blood counts, and gastric contents as may be offered. Salary, $1,800 per year with one month of vacation. Address No. 182, L. G. A., care of this JOURNAL.

Assistant professor of pathology in the University of North Dakota for courses in histology, bacteriology, pathology and hygiene. Will have some expert duties in connection with public health laboratory work. Salary, $2,500 to $2,700. Should consider a younger man for instructor for one year at $1,800. Address No. 183, F. E. H., care of this JOURNAL.

Health officer in Georgia city. Salary, $2,000 to $3,000. Address No. 184, W. L. C., care of this JOURNAL.

Sanitarian for work among the Jewish farmers in Sullivan and Ulster Counties, N. Y. Salary, $1,500 to $2,500. Address No. 185, D. G., care of this JOURNAL.

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RELATION OF VITAL STATISTICS TO PUBLIC HEALTH ADMINISTRATION.

WILLIAM F. PETRIE,
Chief of Vital Statistics, Department of State, Lansing, Mich.

Read before the Vital Statistics Section, American Public Health Association, December 9-12, 1918, at Chicago, Ill.

THAT knowledge which tends most directly to preserve life is the knowledge of the most common causes and conditions which lead to death. As, according to Herbert Spencer, that knowledge which tends directly to preserve life is "of most worth," so the most important questions to be settled are the causes and conditions which lead to most deaths. To be successful in this most important matter, there is needed, therefore, the hearty coöperation of the physicians and people in general in promptly reporting all cases of sickness, especially of those dangerous to the public health.

Vital statistics and public health administration may be termed a business proposition and can be tested by the same standards that are used to determine the value of other industrial activities.

Statistics, in brief, is a system of accounting. The executive in industry and finance requires for the efficient administration of his business, detailed analysis of the cost of production and distribution.

The health officer of the community has a problem similar to that of the business manager in industry, and it is through vital statistics that he must test the efficiency of his management.

It is the function of the vital statistician to provide the necessary data to the health officer as regards the movement of population, the number and causes of deaths, as well as data concerning births occurring in his community.

In undertaking to outline some of the reasons why vital statistics form such an indispensable part of the public health administration of all progressive cities, states and countries at the present day, we may divide the subject into two heads: (1) Why reliable vital statistics are necessary to the progressive health officer; and (2) why progressive, active, intelligent health officers are indispensable to reliable vital statistics.

Some of the reasons why reliable vital statistics are necessary to the progressive health official may be stated as follows:

1. They give him timely warning of the occurrence of epidemics and of the appearance of especially dangerous forms of communicable diseases, (a) in his own jurisdiction; (b) in adjacent districts, or in localities in the state from which his own may be especially liable to infection through routes of travel.

2. They enable him to control public funerals, using such restrictions as may be necessary to check the possible spread of infectious diseases from this source.

3. They enable him to regulate the shipment of bodies dead of dangerous communicable diseases, and to exercise such supervision as may be necessary in order that all precautions required by sanitary authorities shall be taken.

4. They enable him to check the neglect of physicians to report cases of dangerous communicable diseases.

5. They enable him to learn, and to demonstrate to the public as well, the efficiency of his work, and of the work of others, as shown by reduced mortality from certain diseases or groups of diseases.

6. They enable him to exercise a general sanitary supervision over his state or district and are especially useful in

showing the vulnerable points where efforts may best be made to improve the public health and reduce the death-rate.

In the matter of timely notification of infectious diseases, health officers, when not themselves the local registrars, should frequently consult the clerk's list of permits issued. The registrars are not medical men, and certificates of death may be filed with them containing statements of causes of death which the registrar will not understand as relating to infectious diseases, but which the more experienced judgment of the medical officer of health will at once identify. Thus "tonsilitis," "croup," or "heart failure," in localities where diphtheria has been prevailing may either by accident or design conceal a death from diphtheria. It may happen that the first information of a dangerous communicable disease may be obtained from the certificates of death, the medical attendant, if any, having neglected to report to the health officer as required by law. In such a case, the health officer has an excellent lever for the better enforcement of the law requiring physicians' reports which he can make use of as far as his judgment may approve.

As regards warnings of the presence of dangerous diseases in other districts, the *Bulletin of Vital Statistics*, issued from the office of the Secretary of State each month, ought to be most useful for this purpose. It is sent to all of the health officers in the state, and contains statements of the deaths reported in each city and county in the state from the diseases which are subject to sanitary restrictions, as well as some others.

The persistent, intelligent use of reliable vital statistics by Boards of Health in their reports and in occasional communications to the press on matters of timely interest, is one of the most effective methods of strengthening the position of public health workers in the public mind. Note that the reservation is emphatic as to the use only of fully reliable statistics, and as to their use only in an intelligent, guarded way, making full allowance for all sources of possible error and misinterpretation. To make exaggerated statements calculated to arouse and unduly alarm the public, is sure, in the long run, to react against the source of the information. Too many cries of "Wolf! wolf!" without sufficient cause may lead to apathy when there is real necessity for alarm.

Boards of Health should be especially conservative in the use of death-rates, and should strive to be on the safe side in the estimation of populations upon which such rates are based. It is very easy, and may be very tempting to a new régime in a city health department, to make a sanguine estimate of the population (which civic pride will be only too ready to sustain) or to draw inferences from the number of names in the directory, etc., as to the number of inhabitants, in such a way that the annual death rate "shows a marked decrease over any preceding year." Then similar measures must be employed for the following year to show the continued reduction of mortality that almost invariably is found necessary to sustain the public confidence, and so the matter goes on until the rude awakening of a census shows that the previous estimates of population have been very wide of the mark, or else an attempt is made to bolster up the cherished ideas of the community in its greatness by discrediting the census enumeration. It would be very desirable for purposes of vital statistics if we had a more frequent census of population, but as it is, we can adopt some of the accepted methods of making estimates for intercensal years, and should announce all death-rates as based thereon.

and draw all sanitary inferences with full reference to the amount of possible error in the data.

In studying the records of mortality for the purpose of seeing upon what points sanitary efforts may be best directed, careful consideration should not only be given to the prevalence of various diseases, but the distribution of age-periods, as especially affected by certain classes of diseases, should be noted. We may probably expect to produce more effect upon the general death-rate by the prevention and cure of diseases of children under five years, and especially by the restriction of diarrhœal diseases of infants under one or two years of age, than in any work on tuberculosis. Our death-rate from these diseases is less than that of the states having a more densely crowded population, but is far too large, especially in the larger cities of the state.

In putting together these suggestions in regard to the uses of vital statistics, I have naturally laid most stress upon mortality statistics, with which I am personally most engaged. But the term vital statistics is a very broad one, and one of the most important classes of statistics included under this term for the practical use of health officials is the statistics of sickness. I am glad to be able as an outsider not connected directly with the collection of these statistics of sickness in the office of the State Board of Health to say a commendatory word, and to endeavor to emphasize, in some slight degree, the necessity of their careful study in order to obtain a thoroughly complete idea of the conditions attending life and health in this state.

Mortality statistics do not, and can not from their nature, tell the whole story. Sickness and disability are as real as death, and the appreciation of the means for their prevention is as legitimate a function of a Board of Health as the reduction of the death-rate. Because it is somewhat more difficult to measure the volume of morbidity and to accurately show the relations of public health work to its diminution, constitutes no reason why we should not gather very valuable data on this subject, and be able to make excellent practical use thereof.

It is possible, with increased facilities, to measure the absolute amount of sickness prevalent at any time, that is to say, the total number of cases of each disease. Exhaustive statistics are, however, not necessary in this respect, by only reliable representative data. By representative data of sickness we may understand fair samples of sickness taken in a uniform and regular manner by observers stationed about the state in such a way that the average of their reports shall closely approximate to the general conditions prevailing over the state. It is evident that a sufficient number of observers must be employed, and that the manner of their distribution is very important. In general the number in any given locality should be in proportion to the population. All parts of the state must be represented, and in the changes which occur from time to time, care must be taken to see that no particular portion of the state acquires a predominating degree of influence.

With those conditions, it is believed that a very useful and accurate picture of the prevalence of sickness may be obtained. Michigan has enjoyed the benefits of such a system of reporting sickness for over twenty years, and through the continuous and persistent efforts of the secretaries of the State Board of Health during that time, a very considerable mass of material has been collected, which has proved exceedingly useful in the past in the practical work of the Board, and

will form a substantial basis with which to make comparisons in the future. It is especially valuable because it has been collected by a uniform method during the whole of that time. Statistics of any class owe much of their value to uniformity of methods, which alone renders it possible to compare successive years with accuracy, and in time establishes a normal or average condition which is useful as a basis of reference.

We may check the validity of these statistics of sickness to some extent by comparing them with the statistics of death collected by the State Department. It is, of course, to be understood that an exact correspondence cannot always exist from the nature of the data. The ratio between the amount of sickness and the amount of mortality, or the fatality of disease, is a variable one. It varies for the same disease in different epidemics, and even in different portions of the same epidemic. But, on the whole, there is a fairly close relation between sickness and deaths from a given disease, especially from diseases which have a high death-rate.

Passing to the second branch of my subject, I shall only very briefly present some of the ways in which medical officers of health may aid in the work of registration. In general, if the health officer fully appreciates the advantages which may result to his work by the utilization of reliable mortality statistics, and endeavors to avail himself of them he will aid the work of registration in the most effective way. That is:

1. By making practical use of its results. The moral support of the health officer, his influence with undertakers and with the people, and the confidence of the registrar that in case of difficulty or opposition in the execution of the law a tried and competent supporter is at hand, will naturally follow.

2. By aiding the registrar in determining causes of death.

3. By refusing to allow any body, dead of a dangerous communicable disease, to be transported into or out of his jurisdiction, unless the certificate of death has been filed with the registrar and a permit issued in due form.

4. By notifying the registrar of any cases of failure to file certificates of death that may come to his attention.

5. By giving personal attention to the work of registration, if a registrar, and seeing that the certificates are properly recorded and promptly returned.

In conclusion, while, as previously stated, in Michigan the public health and registration services are for the most part distinct, this paper has throughout been constructed upon the belief that they are fundamentally one, and that neither can develop to the best purpose and to the fullest extent unaided by the other. While the registrars are able to relieve the health officers of much tedious clerical work, with very slight compensation, thus leaving them entirely free from the more urgent duties of restricting diseases, sanitary inspections, and the like, the health officers should, nevertheless, keep a vigilant eye upon the accuracy of registration in their districts, and whenever necessary, by reason of neglect or inattention on the part of a possibly untrained registrar, take active measures to secure the completeness of returns. For this purpose the State Department will cordially coöperate at all times, and advice and assistance from the health officers of the state will always be appreciated. The fact is recognized that the present high standing of Michigan as a registration state has only been achieved through the support of the profession and people of the state derived from a long and thorough antecedent training in the appreciation of the utility of public health work

COÖPERATION OF STATE AND FEDERAL GOVERNMENTS IN REGISTRATION OF BIRTHS AND DEATHS.

JOHN EMERSON MONGER, M. D.,
State Registrar of Vital Statistics of Ohio, Columbus, Ohio.

Read before Section of Vital Statistics, American Public Health Association, December 9–12, 1918, Chicago, Ill.

THAT we might better improve registration conditions in Ohio, a careful study was made of systems used in other states, and because of this study our previously conceived notions of registration methods are completely reversed.

First of all, we found that several states operating under the model law; or, better, the model law with slight and nonessential variations, showed very marked differences in results. We thought this could be explained by variations in character of the population, but a closer analysis showed this to be only a slight factor. Requirements of state medical boards were then considered, we thinking that possibly the higher standard of professional training required in some states might be a factor, but we were forced to the conclusion that this was also a negligible factor. After much consideration from every possible angle, we were forced to the conclusion that there must be some reason aside from laws, population or professional personnel, and we believe that reason is based on the personality of the head of the registration system. By personality, we mean the ability of the registrar to successfully carry on a propaganda for complete registration.

I believe the largest single factor in either success or failure is propaganda. Another preconceived notion that this study of methods has thrown overboard is the fact that our propaganda should not be directed to the physicians, but to the public. Every physician knows he should report, and he does not report because of plain, ordinary, everyday carelessness.

There is no use wasting time in hammering home and reiterating a lesson that has already been learned, for the way to reach a physician of this class is to educate his clientele to the advantages of registration and its very intimate personal value to them—and the fear of loss of business will cause this class of practitioners to comply with the law. Public opinion must be so molded that it becomes in this, as in all other governmental activities, mightier than any statute and more effective than any court decision.

I believe in prosecution, but the biggest value of prosecution is the publicity given it, with the consequent education of the public to the value of registration. The fact that a prominent physician was arrested and fined is only of value to the cause of registration because of the number of people to whom is thus pointed out the personal value of registration. We have relatively few prosecutions, but those we have had have been given wide publicity, and we usually pick out some case that drives home a lesson to the public.

I think the prosecution that did us the most real good was that of a prominent man in an Ohio city. The child in question was blinded by Ophthalmia Neonatorum and the case was discovered by a visiting nurse. In checking over the records the birth was found not reported. Of course, there is no connection between a blinded baby because of a doctor's neglect and a missing birth report because of the same factor, but the newspaper man did not make this fine dis-

tinction and it was simply a hammer with which we drove home the lesson to thousands of people.

The failure of a doctor to report the birth of a child whose father was afterwards killed while serving as a soldier in the Canadian army, was discovered by the application of the mother for a certified copy which would secure her a pension. Buried in the official files of the office, this appeal would have been of no value, but directly, from this publicity a very distinct case of its value is evident. This letter was shown to the recalcitrant doctor, who had boasted of his failure to report, and it so struck him that he had a special meeting of his County Medical Society called, and promised his fellow-practitioners that not only would he report, but that he would personally prosecute any member of the Society who failed to report. These men spent a great deal of time securing data and filing certificates of children born in the last six years—and, as a result of these activities, a women's club took up the work, with the result that a baby census of every child under six years of age was made in a good sized city and the work of securing the registration for every child up to six years is under way. We have succeeded in interesting various women's clubs, such as the Parent-Teachers' Association and the State Federation of Women's Clubs. These Clubs have given us services of incalculable value.

In a number of our counties a complete baby census has been made. As a result of this work the current registration of many counties has increased as high as 400 per cent, and in addition we are able to secure hundreds of certificates of children born in other years.

The appeal of an American Consul for a certificate for an American girl so that she could marry was so used by our Publicity Department that it did a tremendous amount of good. This girl was the daughter of a bandmaster in a United States army regiment stationed at Columbus. She had become lost to her family, which at this time consists of four sisters, living at various places in the country. This publicity not only reunited these sisters, but secured the birth certificate, necessary because of the suspicion of expatriation having arisen against this girl.

Another case was that of a young Austrian, born in an Ohio city some twenty-six years ago. Soon after his birth his parents moved to another state and died. At the outbreak of the war he was in Austria in a commercial capacity, and he was arrested as a military-service evader. He protested to our ambassador, but absolutely no trace could be obtained of his birth; so here we have an American citizen forced to serve in a foreign army and later forced to fight his own country because of his inability to produce a birth record. This case had a dramatic appeal and served to teach thousands the value of registration when proper use was made of it.

Our biggest opportunity is to pick out cases which have a wide personal appeal to a particular class, and inasmuch as they have a very decided value as news, publicity is easily secured. Cases are selected because of their personal appeal; *e. g.*, this latter case aroused the interest of our alien population. The mother's application for certificate for pension, the interest of dependents of soldiers, and specific cases illustrating the necessity of securing a certificate for allotments were also used.

The story of the young Ohio Jew who was caught in Russia at the outbreak of the war and whose privations while awaiting a certificate, reads like a novel, has an appeal to this race.

The young Lutheran caught in a foreign country at the outbreak of the war, and whose birth data was found in the records of an obscure Cincinnati church, brought the lesson home, especially to the members of this denomination.

The story of the inaccuracy of the physician in making out a death certificate for a member of a big fraternal order, causing months of delay in the settlement of his insurance, had a direct appeal, not only to this order but to every man carrying fraternal insurance.

Time is too limited to go further into details, but the big thing is to select cases that not only have a general, but an especial appeal.

Instead of pounding our physicians and arousing their animosity, we try to show them that they are amply repaid in the scientific value of our compilations for all the trouble they are put to. We reach them through our medical journals and our county societies. They are always glad to have a talk on the subject of vital statistics, and these discussions have been mutually helpful, as we have received many valuable suggestions from members of the profession. In this way a professional conscience can be aroused, and when you can show a man that he is in reality contributing something not only of personal interest, but of tremendous scientific value, you have secured his lasting coöperation.

The average doctor does not know his real debt to statistics, but when we can educate the public to the personal value to them of registration, we need never worry a moment about the doctor, for the public will educate him. Let an irate mother who discovers that her child is not registered, while her neighbor's child is, have a five minutes' seance with the doctor and it will do him more good than a dozen prosecutions.

Our mother's certificate plan did a great deal of good, but because of limited funds we had to discontinue it when the increase in postage rates was adopted. We are using two thousand infant welfare bulletins of the children's bureau per month, with very marked value. These are mailed through the "Frank" and are used in weak districts. Unfortunately, we can only secure about 20 per cent of our needs, but we are using them in lax communities with marked benefit. I think this is the most useful and best written bulletin our government issues.

We have established a system of what we call back registration that arouses a great deal of interest. We have those desiring a legal record make out a certificate, properly sworn to, which we file and index. People so registered become apostles of registration. While it takes considerable time to register and index these, we are amply repaid for it by the interest aroused.

While this work can be carried out by a state, I believe that it can be better carried out by our Federal government.

To those of us who have watched the trend of affairs in the government during the last few years and especially during the last few months, it is evident that our government has undergone a tremendous change. While this change has been so subtle that it was hardly noticeable in passing, yet when we compare what actually exists today with what existed yesterday, we can see its portent. I refer to the nationalization of our country. Yesterday we were not a nation; rather, we were a federation. And today we are a nation in the truest sense of the word. Only a few years ago we were torn by sectional, class, religious, industrial and many other interests. Today the fiery furnace of war has melted these various lines of cleavage and we find that our dream of nationalization

has come true; and it is not unreasonable to believe that the events of the immediate future will further solidify us.

Now, this tendency has a tremendous effect on our work and if advantage is taken of it, the registration system of our country will not be a series of isolated islands only partially in correlation, but will become a closely related, thoroughly coördinated and above all, an entirely efficient and effective organization.

Originally a state's rights supporter, the events of the last few years have convinced me that more effective and more efficient work can be done by a closer association or better supervision by our Federal government. Nationalization of our governmental and especially our administrative agencies is not coming—it is here. I am not driving at individual effort, whether it be of the Federal or the state, but I believe that the time has come when we must work out some plan of a closer coöperation in the activities of both. Because of conditions arising out of the military aspect of our government we must have complete registration and the public will not rest content with the more or less slipshod individualistic efforts of the past.

A certificate of birth or death has three phases: first, its value to the individual; second, its value to the state, and third, its value to the nation—and I place this last because a birth or death certificate's greatest value is to the nation.

The reason we have not a complete registration system is because there has never been a real need of it. You and I know its need, but neither the profession nor the laity did. Now, with all the multitude of reasons poignantly brought forth by this war, the public will demand it. Therefore, the whole problem is this: "Shall we continue to operate as islands, or should we have a centralization of this work by the Federal authorities?"

The Federal government, first of all, has the prestige—we, who have been acting as special agents, know how vastly more effective is the work done by John Smith, special agent, than by John Smith, state registrar. Since our Bureau began this system the improvement of the work has been very marked. In fact, we are practically working on current material, and I ascribe it entirely to the prestige which the "Special Agency" carries.

The Federal government has the machinery, and the adoption of the Federal Mother's Certificate will be an important step toward the desired Federal and State coöperation.

The time has come when complete work must be done and our model law, while it has served an admirable purpose, has outgrown its usefulness and I believe that some plan of nationalization will have to be worked out. Just what plan would be best, I am unprepared to say, but considering all angles, the most feasible and the one involving the least trouble to put into operation, would be a Federal law which would coalesce the various Federal agencies already existing, with the state systems now in operation.

PUBLIC HEALTH NOTES

Abstracts by D. Greenberg, M. P. Horowitz and Mayo Tolman.

Physicians in Medical Corps.—At ten o'clock on the morning of November 11, the War Department discontinued the commissioning of physicians in the Medical Corps. This condition, in all probability, is permanent and no further consideration will be given applicants for a commission in the Medical Corps until further notice.

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Director of Pasteur Institute Retires.—Dr. Pierre Roux, associate and co-worker with Louis Pasteur, the founder of modern bacteriology, is about to retire as Director of the Pasteur Institute of Paris. He will be succeeded by Dr. A. C. Calmette, now Director of the Pasteur Institute at Lille. Dr. Calmette is an authority on tuberculosis.—*New York Times*, December 8, 1918.

(*M. P. H.*)

✽

Vaccine Treatment of Influenza.—The following recommendations, quoted by Sir Arthur Newsholme of the Local Government Board, London, are the result of a recent conference on influenza held by bacteriological experts in England.

It was agreed that inoculations with a suitable vaccine might be of value in controlling the incidence and severity of the epidemic. In preparing the vaccine for prophylactic use, different strains of B. influenzae, and the pneumococcus and streptococcus isolated from recent cases should be used. The vaccine should be sterilized at 55° C. for one half hour, and 0.5 per cent of carbolic acid should then be added as an antiseptic. It is desirable to give two doses of the vaccine at an interval of ten days. The first dose should contain 30 million influenza bacilli, 100 million pneumococci, and 40 million streptococci. The second dose should contain just twice the number of each species used in the first dose. A full dose may be given to all those above sixteen years of age. It is inadvisable to inoculate children less than three years old. For children from three to seven years, one fourth of the full dose may be given, and for children from seven to sixteen years, one half of the full dose. The reäction in every case should be very mild. Wherever possible it is desirable to carry out the inoculations before exposure. Inoculations should not be given to individuals having the disease or showing the symptoms of the disease.

When used for treatment the vaccine is likely to be of greatest service in subacute and chronic cases. The initial dose in these cases should be one fifth of the initial dose when the vaccine is used as a prophylactic. In severe cases of secondary bronchopneumonia, the vaccine should not be used.—*Medical Officer*, London, Nov. 9, 1918. (*M. P. H.*)

✽

Don't Shake—Salute.—Let society pull down the sentiment that keeps up hand shaking and insist on the salute instead. There can be little doubt but that hand shaking is responsible for the spread of much sickness. The nose and mouth may harbor untold numbers of disease-producing germs, influenza, pneumonia, diphtheria, scarlet fever and other infections, and the hands find their way to the face many times each day and each time they may gather myriads of bacteria to pass on to some one else with the next greeting.—*Bulletin Chicago School of Sanitary Inspection*, October 26, 1918.

(*M. T.*)

✽

Applications of Lessons of Military Sanitation to Peace Times.—At the annual convention of the Association of Life Insurance Presidents, held in New York on December 6, Major-General William C. Gorgas, through his proxy, Colonel W. D. Wrightson, said that one of the chief lessons to be derived from the war for sanitarians and those interested in protecting the public health was, that overcrowding favored the spread of disease, particularly diseases like pneumonia. According to General Gorgas it is unwise to crowd from 144 to 200 men in barracks. This was responsible for the spread of pneumonia after the measles epidemic of 1917 and the pneumonia resulting from influenza in 1918. In both of these epidemics the mortality rate was high. It is estimated that the death-rate from influenza in the army was five times as large as among the civil population of New York City. Instead of crowding the men together in large barracks, small huts, 20 by 20 feet in plan, capable of housing six men, are recommended. It was impossible to avoid overcrowding on board the transports since the military necessity was so great. This, however, aided in spreading disease. During the influenza epidemic, the Vaterland with 10,000 to 12,000 men on board lost 70 men from pneumonia on its trip to France, and 300 men were taken to hospitals at the port of debarkation. The remedy for overcrowding among the civil population rests in increasing the wages of laborers, so that they may be enabled to have better housing facilities.—*New York Times*, December 7, 1918. (*M. P. H.*)

PUBLIC HEALTH LABORATORY NOTES

Abstracted by ARTHUR LEDERER, M. D.

Influenza.—Abstracts of foreign literature compiled by the British Medical Research Committee appeared in the *Jour. A. M. A.*, 71, 1573 (1918).

✱

Studies of Bovine Mastitis.—The principal sources of streptococcic infection, aside from clinical cases, are apparently normal cows which carry the virus in the udder. A milker may readily carry streptococci on his hands from an infected to an uninfected cow. The vaginæ of thirty-four of the sixty-four cows examined contained non-hemolytic streptococci. In no instance have hemolytic streptococci been isolated from the vagina.—F. S. Jones, *Jour. Exp. Med.*, 28, 735 (1918).

✱

Standardization of Antimeningococcic Serum.—Experiments were made for the purpose of testing the reaction of protection against infection as a measure of potency of antimeningococcic serum. The results of the experiments were extremely variable and bore no relation to the quality of the sera as determined by the period of immunization of the horses from which they were obtained, or the indications of efficiency based upon their employment in human cases of epidemic meningitis. The results also failed entirely to conform to the agglutination titer of the sera tested and to be affected by the different type forms of the meningococci. The authors regard the protective power for laboratory animals of the antimeningococcic serum as an unsuitable index of its value in human medicine and as inferior to the agglutination titer as a standard of potency.—H. L. Amoss and P. Marsh, *Jour. Exp. Med.*, 28, 779 (1918).

✱

A Plate Method for Isolating Anærobes.—Dilutions of the material to be plated are made in the usual way; melted deep agar tubes are inoculated and plates poured. The plates are immediately chilled and as soon as the agar sets, another deep tube of sterile agar is poured over the surface of each plate. The plates are again chilled to set the second layer of agar, and the surface of each is covered with a layer of melted paraffin, care being taken to have the paraffin completely cover the surface of the agar. The second tube of agar should be cooled to 42° C. before it is poured over the surface of the plate. Tetanus and gas bacilli grow well by this method.—G. F. Dick, *Jour. Inf. Dis.*, 23, 578 (1918).

Reading of Hydrogen Ion Concentration.—The author employs a mixture of China blue and rosolic acid as an indicator. The indicator can be added directly to media and permits easy, direct estimation of hydrogen ion concentration in the culture at all times. Heating has no effect.—J. Bronfenbrenner, *Jour. Med. Res.*, 39, 25 (1918).

✱

Simple Method for Blood Cultures.—The patient's blood diluted in a test tube of sterile water makes an excellent culture medium for a number of infections, at the same time furnishing the infecting organisms. In pneumococcus and streptococcus infections, the method compares quite favorably with other cultural procedures; and in positive cases the bacteriologic diagnosis can be made in nearly every instance from the primary culture in 24 hours. Thirty to 40 per cent is suggested as the optimum dilution if only one tube is made. If two tubes are made one is a 40 per cent dilution and the other 5 to 10 per cent.—J. G. Wurtz and S. W. Sappington, *Jour. Med. Res.*, 38, 371 (1918).

✱

Uric Acid Synthetic Medium for the Differentiation of B. Coli and B. Ærogenes.—The medium has the following composition:

Distilled water	1,000 cc.
Sodium chloride	5.0 gm.
Magnesium sulfate	0.2 gm.
Calcium chloride	0.1 gm.
Di-potassium-hydro-phosphate	1.0 gm.
Glycerol	30.0 gm.
Uric acid	0.5 gm.

In this medium B. ærogenes grew luxuriantly and soon produced a dense clouding. B. coli failed to develop and the tubes remained clear. Hypoxanthine hydrochloride, when substituted for uric acid, gave the same differentiation, although B. ærogenes appeared to grow less luxuriantly than in the uric acid medium.—St. A. Koser, *Jour. Inf. Dis.*, 23, 377 (1918).

✱

Demonstration of Pest Bacilli in Rat Cadavers.—As a substitute for bacteriologic methods a precipitin reaction is made with a physiologic saline extract of the organs of a suspected rat to determine the presence of the B. pestis.—A. Doll and Ch. Warner, *Z. Hyg.*, 84, 67 (1918); *Chem. Abst.*, 12, 2341 (1918).